March 25, 1963

QUARTERLY REPORT

Prepared On

CONTRACT NO. NObsr 81262

Prepared For

BUREAU OF SHIPS
Department of the Navy
Washington 25, D. C.

491-01

Prepared By

APPLIED RESEARCH INC.
76 South Bayles Avenue
Port Washington, N. Y.

1.0 ABSTRACT

1.10 This report covers work done on the development of an RF Spectrum Analyzer in the range from 100 MC to 1000 MC for the three month period from November 1, 1962 to January 31, 1963. It deals with the following subjects:

1.11 Purpose for the development.

1.12 Names of technical personnel engaged in the development program, together with a summary of the man hours work performed by each.

1.13 A description of the work done during the period from November 1, 1962 to January 31, 1963.

1.14 A project performance and schedule chart is included.

1.15 Program for the next three month interval.

2.0 PURPOSE FOR THE DEVELOPMENT

2.10 The RF Spectrum Analyzer shall be developed for the visual display of amplitude and frequency of RF signals in the frequency range of 100 MC to 1000 MC.

2.20 The frequency range of 100 MC to 1000 MC shall be displayed in four swept bands on a 5" oscilloscope screen.

2.30 The spectroscope shall have sweep coverage up to 300 MC electronically with high resolution, with no spurious responses and no internally generated interference.

2.40 It shall be useful as a search receiver, spectrum analyzer, noise interference analyzer or as monitoring equipment.

3.0 TECHNICAL PERSONNEL ENGAGED IN THE PROGRAM AND MAN HOURS

3.10 The following is a list of technical personnel engaged in the development of the RF Spectrum Analyzer together with the total number of hours spent by each during the period from November 1, 1962 to January 31, 1963.

Name	Total Hours Per Man
Brafman, R.	119.75
Brown, H.	76.00
DeProspo, M.	16.00
Garbauskas, A.	30.25
Heller, M.	144.75
Pollachek, L.	13.75
Strasser, L.	44.00
Vlismas, T.	126.75
Vulcan, A.	58.25
Dennis, W.	48.50
Walker, A.	72.25
Meyer, J.	56.00
Morrison, E.	108.00
Duplatre, R.	40.00
Vergara, J.	67.00
Brovetto, W.	71.25
Merberg, M.	100.00
Kertesz, Z.	16.00
Williams, A.	26.75
Kennard, A.	185.00
Kennedy, P.	21.75
TOTAL	1,442.00

4.0 DESCRIPTION OF WORK

4.10 During the period of this report the power IF amplifier/linear detector, Unit 1A7A8, was fabricated, aligned and tested. A schematic diagram of this unit is shown in Dwg. No. D600802, Figure 1. For convenience, a block diagram of the RF Spectrum Analyser is given in Dwg. No. R700449, Figure 2. Unit 1A7A8 was found to have the following characteristics:

Center Frequency:	775 MC
Peak to Valley Ratio:	0.1 DB at 775 MC ±2.75 MC
Bandwidth 3 DB:	11.8 MC
Gain:	26.5 DB
Input VSWR:	<1.5:1 (at 50 ohms)

4.11 The lin-log preamplifier, Unit 1A7A17, Dwg. No. C600853, Figure 3, fabricated in late August of 1962 was aligned and checked during this period. It consists of two stages of amplification with a shaping diode across the output of each stage. In the linear mode of operation, the diodes are back-biased and present a high impedance at the output of each stage. In the log mode of operation, the diodes are forward biased. In system operation, the biasing voltage is a DC feedback voltage derived from a feedback amplifier stage in the lin-log IF amplifier, Unit 1A7A7, and introduced via J3. See Figure 1. Gain, bandwidth, and peak to valley of the passband of Unit 1A7A17 were measured for different levels of DC voltage introduced at J3. The results are presented in Table I below.

TABLE I

Characteristics of Lin-Log IF Preamplifier, Unit 1A7A17

DC Bias Voltage at J3	Bandwidth 3 DB	Peak to Valley Ratio DB	From	To	Gain
-20 volts	13 MC	0	771.75 MC	778.25 MC	+22 DB
-10 volts	19.5 MC	0.5	769.25 MC	780.25 MC	+19 DB
0 volts	23 MC	1.0	769 MC	781 MC	+15 DB
+0.2 volts	22 MC	1.0	767 MC	783 MC	+9 DB
+0.23 volts	23.1 MC	1.0	768 MC	783 MC	+6 DB
+0.38 volts	23 MC	3	768 MC	783 MC	-3 DB

4.12 Two +200 volt power supplies used in the RF heads were returned to the vendor for repair in August of 1962. The reason is that one supply became excessively noisy after one hour of operation. The other supply kept blowing fuses. One of the two supplies sent back was lost on its way to the vendor. Its whereabouts could not be established. Therefore, an ARI regulated +200 volt DC power supply was tested during this period. This supply was considered as a possible replacement for the one lost. The unit when first tested exhibited a 40 millivolt to 50 millivolt bounce at its output. It was found that an oscillation of 800 KC was present at its output. A .01 µfd capacitor was connected from collector to ground of the regulating transistor in this power supply which removed the oscillation. The unit was then tested at no load to full load at a line frequency of 60 CPS and at 400 CPS. The measured results are presented in Table II below.

TABLE II

Measured Regulation and Ripple of +200 VDC Supply

Line Frequency	Volts	Ripple (MV) NL	Ripple (MV) FL	Regulation (MV) NL to FL
60 cps	105	0.8	1.3	30
60 cps	115	1.0	1.0	20
60 cps	125	1.4	1.4	20
400 cps	105	1.0	1.0	30
400 cps	115	1.0	1.0	30
400 cps	125	1.0	1.0	30

4.13 The +200 volt DC supply of Paragraph 4.12 was temperature tested. The DC voltage was set to +200 volts under 100 MA load at room temperature (+21°C) after sufficient warm-up. The temperature was raised to 62°C and allowed to stabilize. The output voltage decreased to +199 volts. The ARI supply exhibits similar stability characteristics to the purchased supplies. The ARI supply has greater reliability and availability.

4.14 During this period the +33 volt, +30 volt DC supply, Unit 1A8PS4, was received from the vendor and was tested at room temperature. It proved to be within spec. The 30 volt output was accidentally shorted. The 0.5 amp fuse in that section blew and was replaced. In subsequent testing of the unit, it was found that ripple from the 33 volt output increased rapidly as the line voltage was reduced below 118 volts at 60 CPS and with both the +33 volt and +30 volt DC outputs under full load. The unit had evidently been damaged by the shorting. The unit was returned to the vendor for correction.

4.15 During this period the vendor sent back to Applied Research the +30 volt/+33 volt DC supply, Unit 1A8PS2, after having corrected the unit to meet specifications. The vendor also temperature tested the unit. The unit was then tested at Applied Research at 60 CPS under no load, full load, and low line, high line conditions. The 30 volt output was within specification with respect to ripple and regulation. The +33 volt output did not meet every specification but was considered adequate for trial in the system.

4.16 The -20 volt, -23 volt supply, Unit 1A8PS3, was received from the vendor. It was checked at room temperature from no load to full load and at low line and high line. The unit was found to be within spec. The unit was returned to the vendor, since he had failed to test it under varying temperature conditions. During this period, the vendor returned the -20 volt/-23 volt DC power supply, Unit 1APS3, after having temperature tested this unit. The unit was tested at Applied Research under no load to full load conditions and under low and high line at 60 CPS and found to be within spec.

4.17 The 6.3 volt DC power supply, Unit 1APS4, was returned by the vendor during this period after the vendor had given the unit a temperature test. The unit was tested under the same conditions as in Paragraph 4.16 and was found to be within spec.

4.18 The +28 volt DC supply, Unit 1A8PS5, was returned from the vendor after having been temperature cycled during this period. It was tested under the same conditions as in Paragraph 4.16 and found to be within spec.

4.20 During this period two low pass filters, Units 1A7A15 and 1A7A16, reworked in manufacturing were returned to the lab. The components of each filter were better shielded from each other to prevent feed-through. The filters were tested. The measured characteristics of low pass filter, Unit 1A7A16, are as follows:

a) 0.2 DB attenuation at 400 MC

b) 3 DB attenuation at 430 MC

c) 44 DB attenuation at 610 MC

d) 60 DB attenuation at 635 MC

e) 90 DB attenuation at 775 MC

f) VSWR Input: $\leq$1.5 up to 402.5 MC

g) VSWR Output: $\leq$1.5 up to 402.5 MC

The measured characteristics of low pass filter, Unit 1A7A15, are as follows:

a) 0.1 DB attenuation at 400 MC

b) 3.0 DB attenuation at 435 MC

c) 40.0 DB attenuation at 588 MC

d) 60 DB attenuation at 705 MC

e) 90 DB attenuation at 775 MC

f) Input VSWR: $\leq$1.5:1 up to 402.5 MC

g) Output VSWR: $\leq$1.5:1 up to 402.5 MC

4.21 The 25 KC crystal filter centered at 30 MC, Unit 1A7A11, was tested during this period. The unit was found to be substantially within spec. It has the following measured characteristics:

Center Frequency:	30 MC
Bandwidth 3 DB:	24.4 KC

Bandwidth 6 DB	27.2 KC
Bandwidth 60 DB:	49 KC
Shape Factor $\frac{(BW60DB)}{BW3DB}$:	1.82:1
Insertion Loss at 30 MC:	3.25 DB
Spurious Responses:	>60 DB

4.22 The 30 MC 5 KC wide crystal filter, Unit 1A7A12, received from the vendor in July was returned to him for correction of excessive spurious responses outside the pass band. During the period of the report, the filter was returned to Applied Research. It was tested and found to be within spec. Its measured characteristics are as follows:

Center Frequency:	30 MC
Bandwidth 3 DB:	4.8 KC
Bandwidth 6 DB:	5.2 KC
Bandwidth 30 DB:	9.2 KC
Bandwidth 60 DB:	13.4 KC
Spurious Responses:	None Discernible
Shape Factor $\frac{(BW60DB)}{BW6DB}$:	2.57:1

4.23 A preliminary subsystem bench test was made on the section involved in the 775 MC to 30 MC to 775 MC conversion during this period. This included the bicoupler, Unit 1A7A9; the 775 MC to 30 MC converter, Unit 1A7A10; the 30 MC crystal filter, Unit 1A7A11; the 30 to 775 MC converter, Unit 1A7A14; the 402.5 MC local oscillator, Unit 1A7A15, and the two low pass filters, Units 1A7A15 and 1A7A16. See the block diagram, Figure 1. A swept signal centered at 775 MC was applied

at J3 of Unit 1A7A9 and the output of Unit 1A7A14 was observed. A loss of -18 DB was found from input to output instead of the design objective of -15 DB. The 775 MC to 30 MC converter, Unit 1A7A10, exhibited a conversion loss of -4 DB instead of the expected 0 DB while the 30 MC to 775 MC converter, Unit 1A7A14, exhibited a conversion gain of +1 DB instead of the expected 0 DB. An attempt will be made to modify the 30 MC conversion units to achieve a lower overall loss while still retaining the basic design concepts and module sizes.

4.30 A project performance and schedule chart is given in Dwg. No. BSF-138, Sheets 1 and 2, Figures 4 and 5.

5.0 PROGRAM FOR THE NEXT THREE MONTH INTERVAL

5.10 During the next interval, it is expected that the following tasks will be completed.

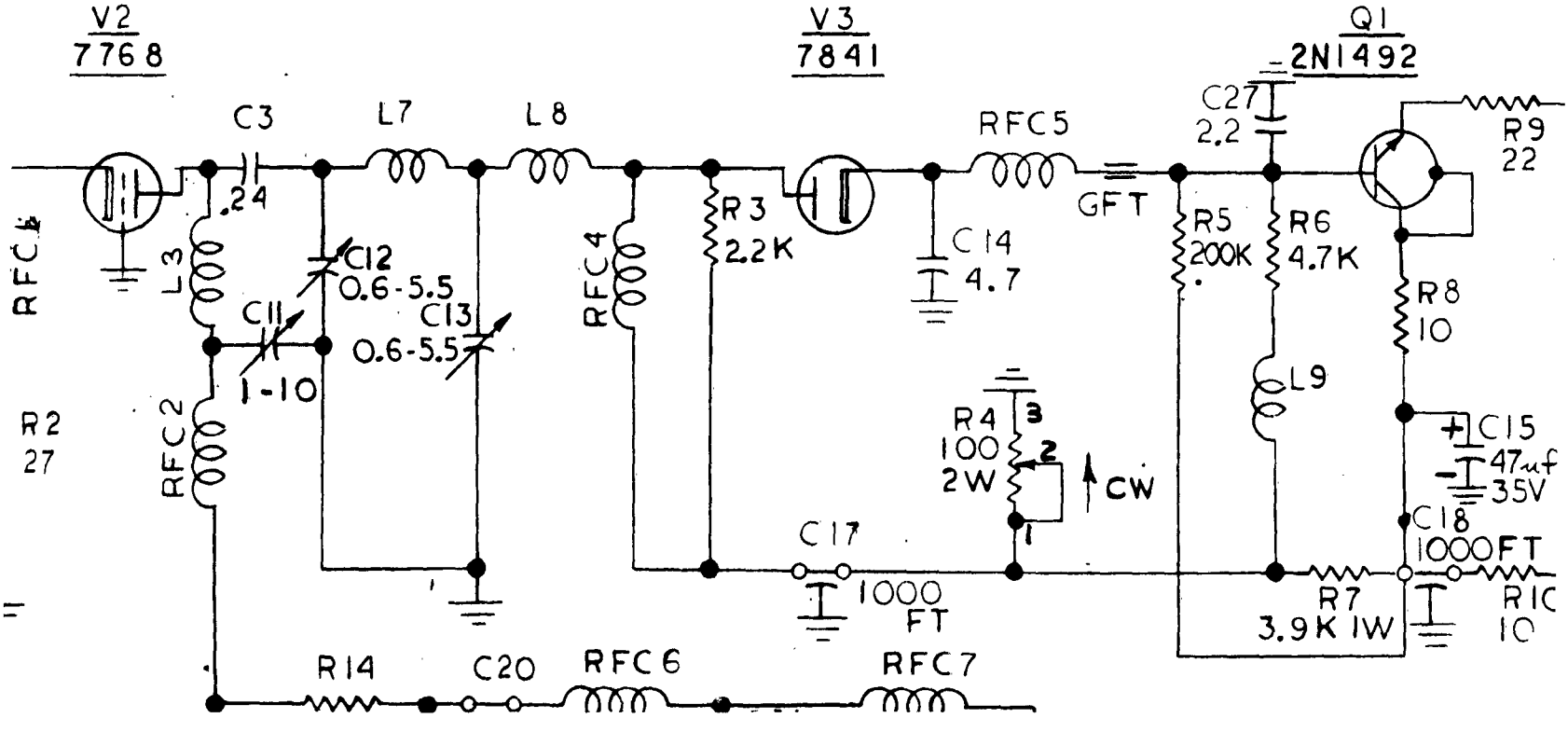
5.11 The console will be completely assembled and wired.

5.12 Final system testing will be completed.

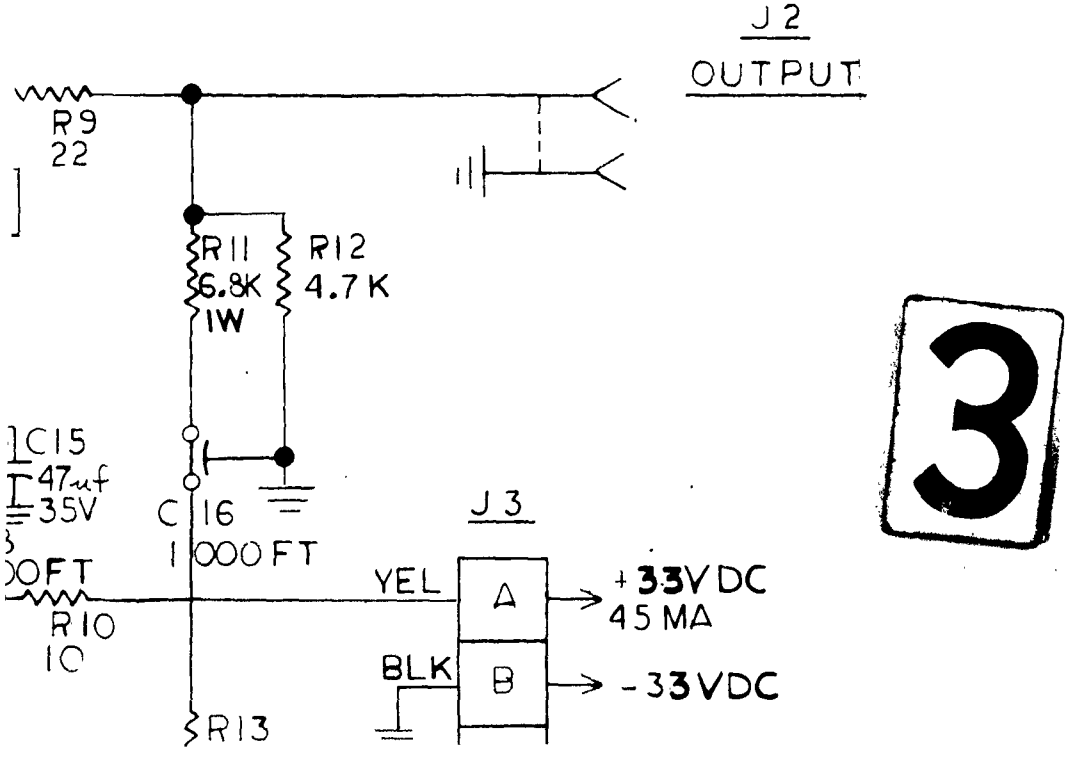
5.13 The Spectrum Analyzer will be shipped.

J1
INPUT
V1
7768
L1
L2
C1
100
C2
.24
L6
RFC 3
L4
C8
0.8-8.5
C9
0.6-5.5
C4
0.6-5.5
C5
0.8-8.5
C6
1000
S0
R1
27
C7
1-10
C10
1000
S0
RFC 17

2


V2
7768
V3
7841
Q1
2N1492
C3
.24
L7
L8
RFC5
GFT
C27
2.2
R9
22
RFC1
L3
C12
0.6-5.5
C11
1-10
C13
0.6-5.5
RFC4
R3
2.2K
C14
4.7
R5
200K
R6
4.7K
R8
10
L9
R2
27
RFC2
R4
100
2W
CW
C15
47uf
35V
C17
1000
FT
C18
1000FT
R7
3.9K 1W
R10
10
R14
C20
RFC6
RFC7

REVISIO	
ISSUE	DESCRIPTION
B	ELECTRICALLY REVISE



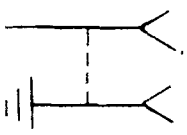
3

REVISIONS			
ISSUE	DESCRIPTION	DATE	BY
B	ELECTRICALLY REVISED	11-9-62	R.D.

4

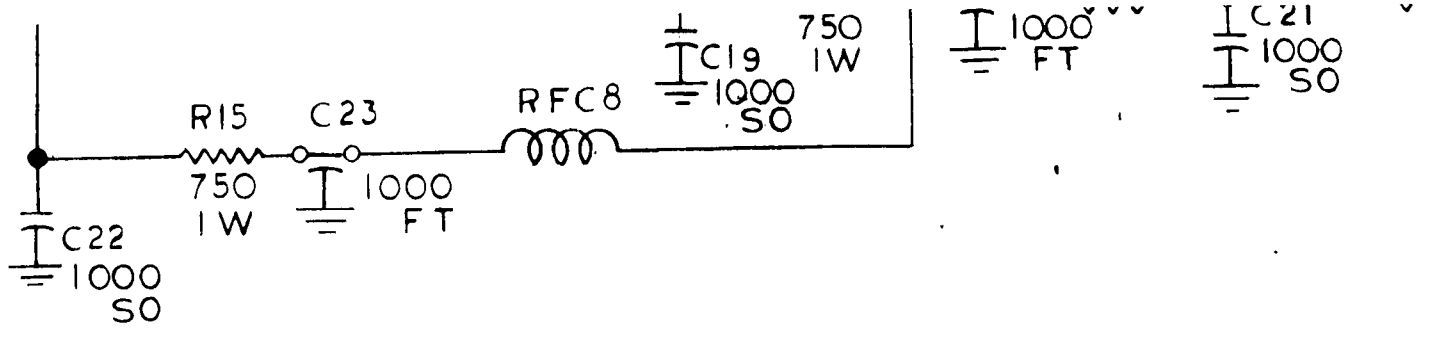
J 2

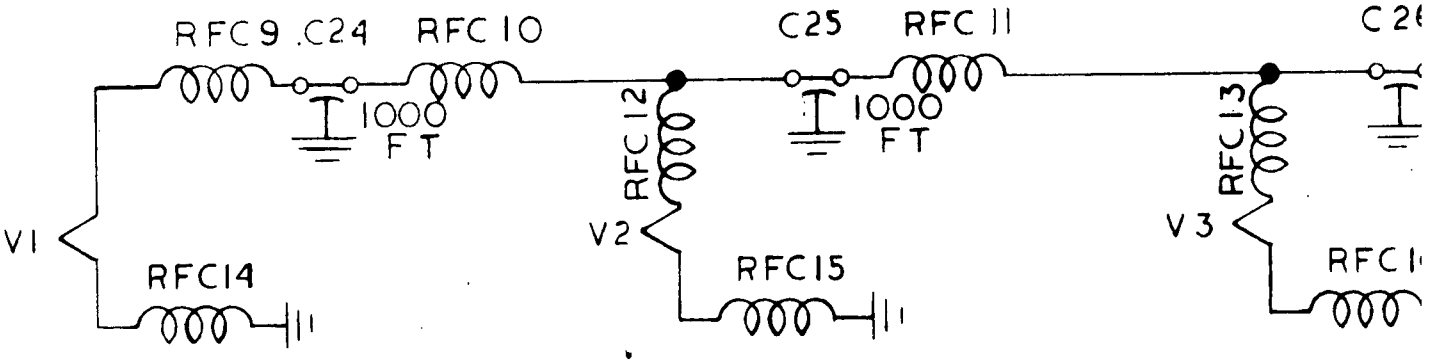
OUTPUT

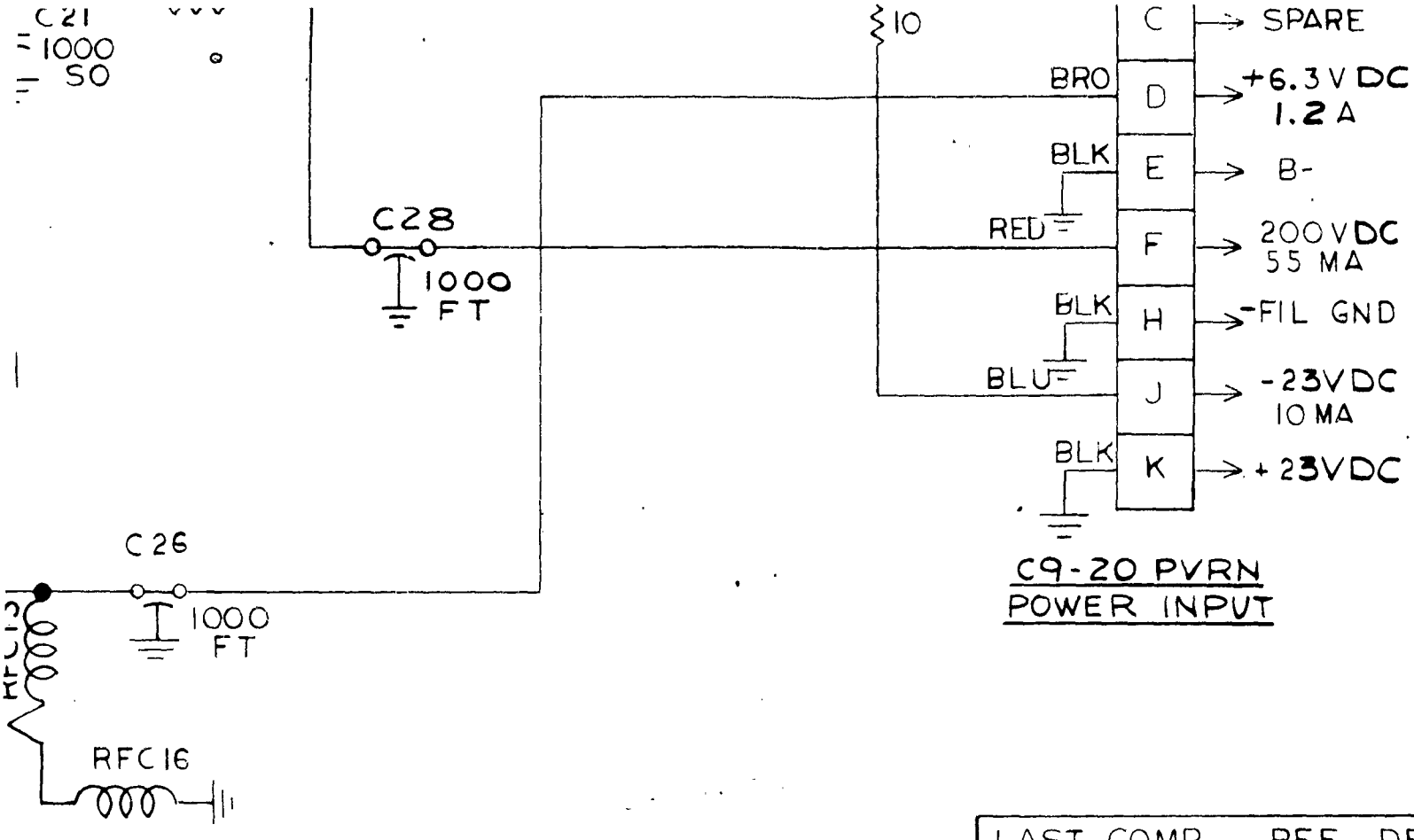


J 3

A	→ +33VDC 45 MA
B	→ -33VDC


750
1W
C19
1000
SO
1000
FT
C21
1000
SO
R15
750
1W
C23
1000
FT
RFC8
C22
1000
SO


RFC9
C24
RFC10
1000
FT
C25
RFC11
1000
FT
RFC12
RFC13
V1
V2
V3
RFC14
RFC15



C9-20 PVRN
POWER INPUT

LAST COMP				REF	DESI
C	J	L	Q	R	RFC
28	3	9	1	15	17

6

491-01	501580
JOB NO.	NEXT ASSEMBLY
APPLICATION	

ALL DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED TOLERANCES:
FRACTIONS ± 1/64 ANGLES ± 1/2°
DECIMALS .XX ± .010 .XXX ± .005

MATERIAL:

FINISH:

C	→ SPARE
D	→ +6.3 V DC 1.2 A
E	→ B-
F	→ 200 V DC 55 MA
H	→ -FIL GND
J	→ -23 V DC 10 MA
K	→ +23 V DC

D PVRN
R INPUT

COMP		REF DESIG		
L	Q	R	RFC	V
9	1	15	17	3

NOTE
1- UNLESS OTHERWISE NOTED
ALL CAPACITORS IN UUF
ALL RFC = ARI 800
ALL RESISTORS ARE 1/2W

600802 ISSUE B

7

ALL DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED TOLERANCES:
FRACTIONS ± 1/64 ANGLES ± 1/2°
DECIMALS .XX ± .010 .XXX ± .005

MATERIAL:

FINISH:

DRAWN 5-24-62
DRAWN BY Brown
CHECKED
APPROVED
APPROVED

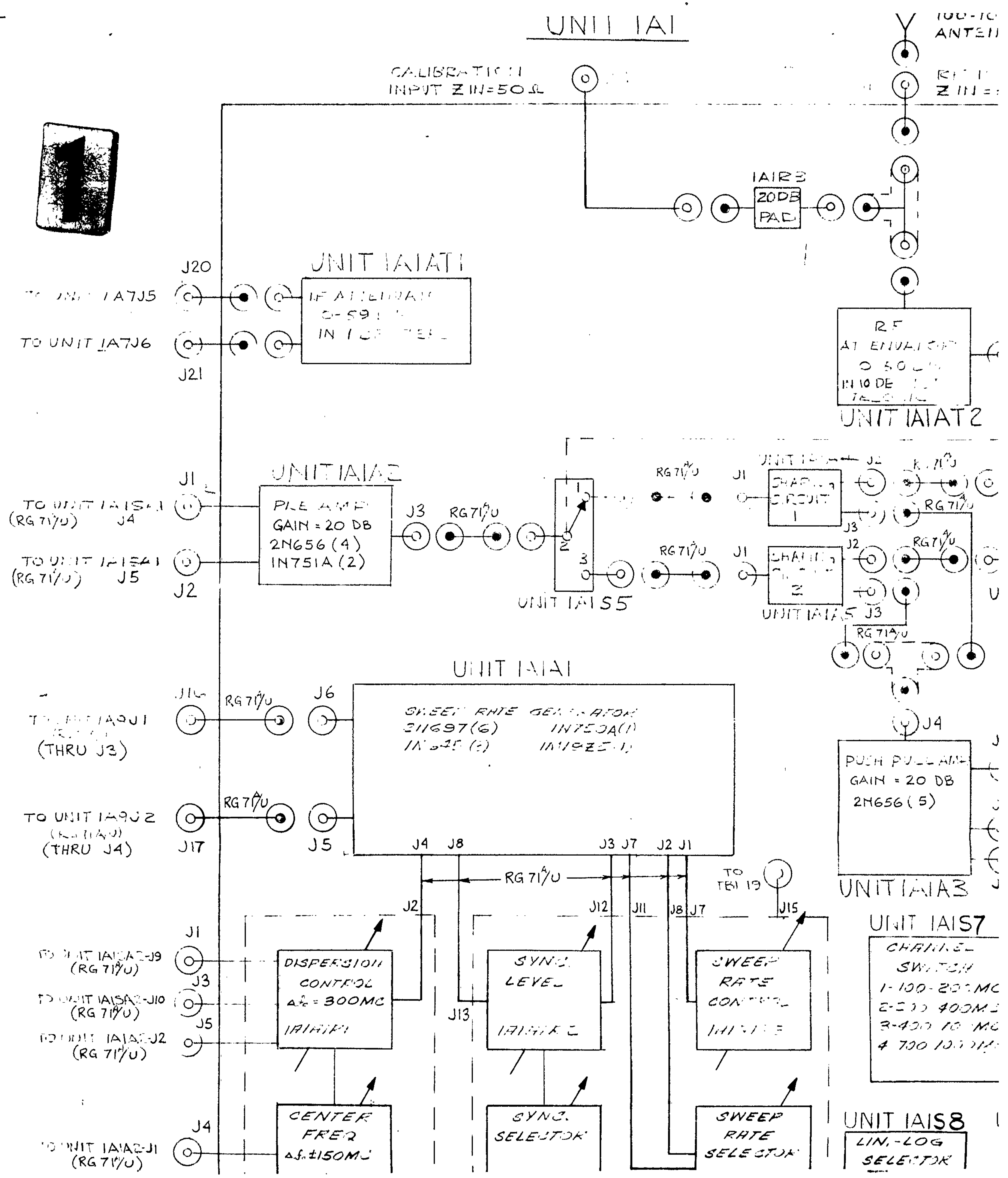
SCHEMATIC
POWER AMPLIFIER
DETECTOR
UNIT 1A7A8

SCALE
UNIT WT.

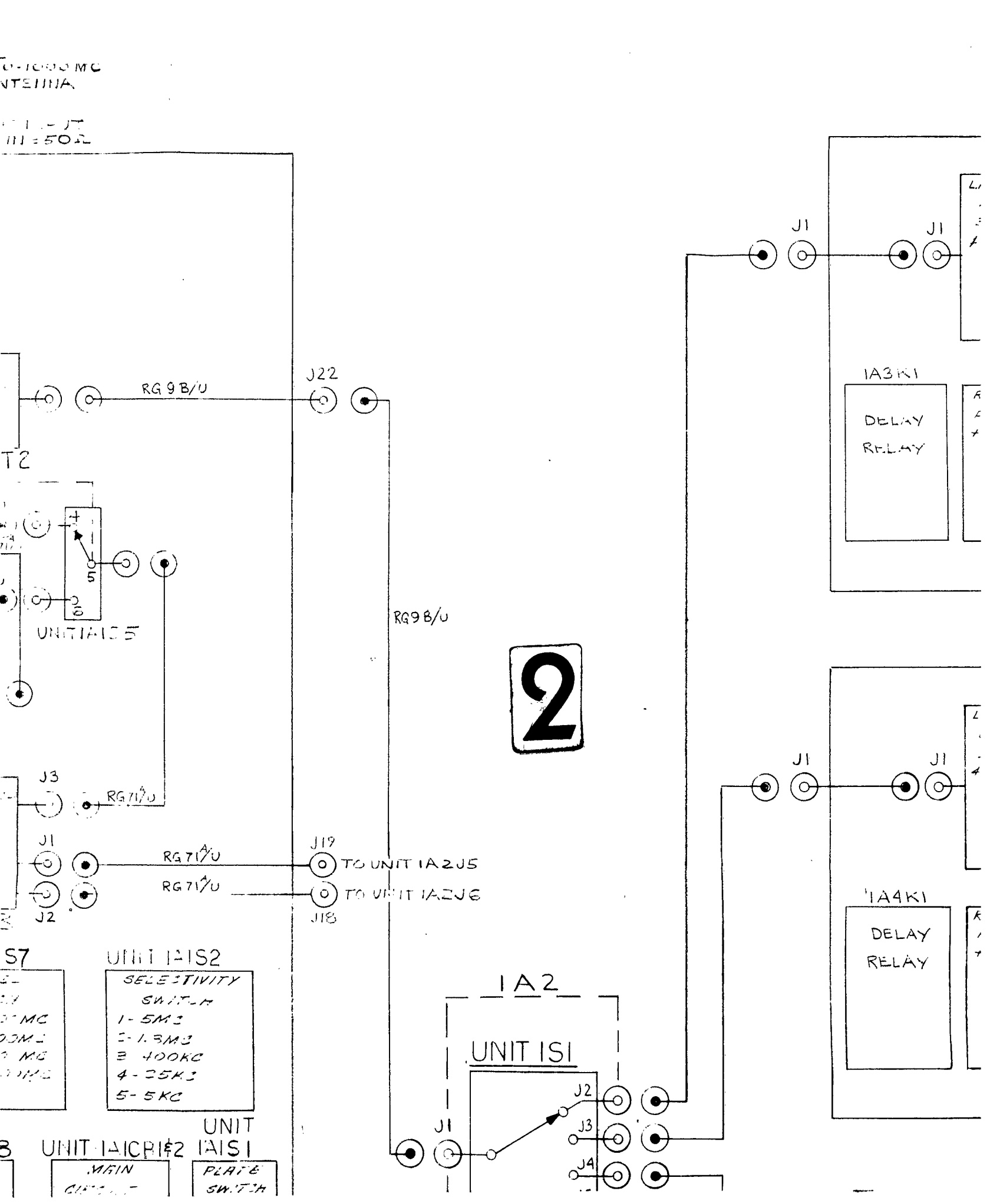
APPLIED RESEARCH INC.
PORT WASHINGTON
NEW YORK

DWG. SIZE D
600802
ISSUE B

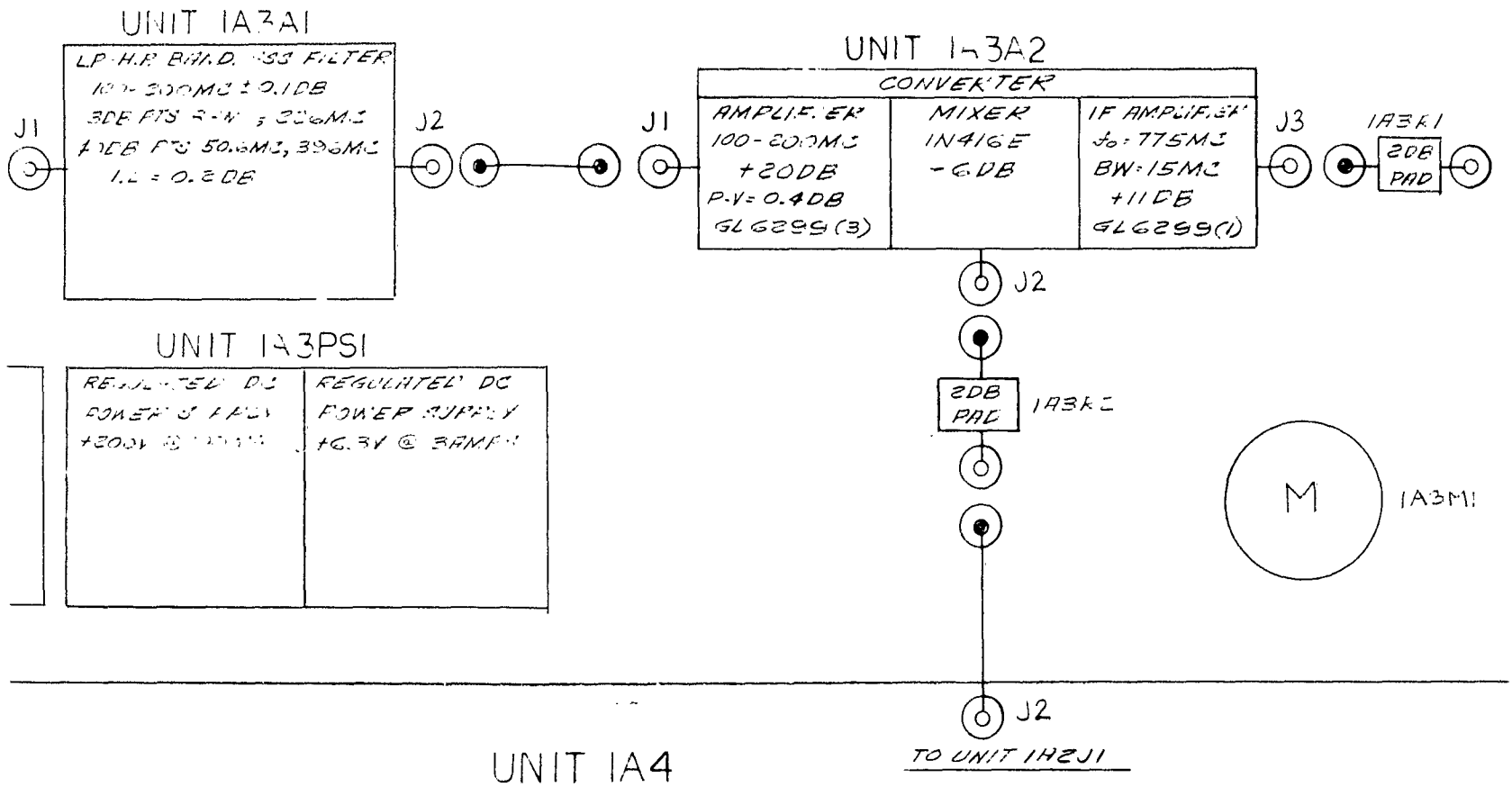
FIG-1



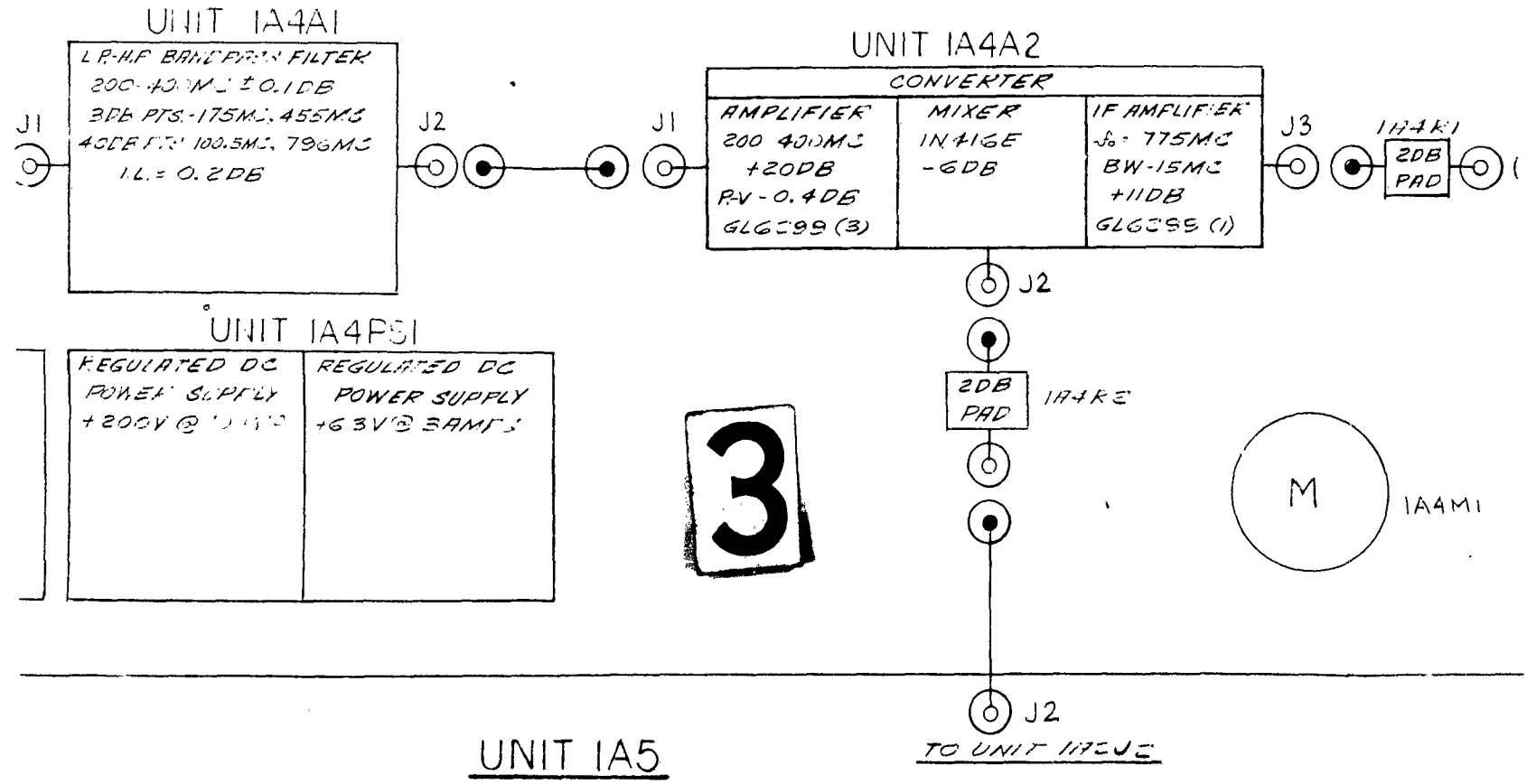
UNIT 1A1
CALIBRATION
INPUT Z IN=50 Ω
1A1R3
20DB
PAD
J20
TO UNIT 1A7J5
TO UNIT 1A7J6
J21
UNIT 1A1AT1
UNIT 1A1AT2
R F
ATTENUATOR
0 50 DB
IN 10 DB
UNIT 1A1A2
PRE AMP
GAIN = 20 DB
2N656 (4)
1N751A (2)
J1
J2
J3
J4
J5
(RG 71/U)
RG 71A/U
UNIT 1A1S5
CHARGING
CIRCUIT
1
2
UNIT 1A1A5
UNIT 1A1A1
SWEEP RATE GENERATOR
J6
J16
J17
(THRU J3)
TO UNIT 1A9J2
(THRU J4)
J8
J7
PUSH PULL AMP
GAIN = 20 DB
2N656 (5)
UNIT 1A1A3
TO TB1 19
J15
J12
J11
J13
DISPERSION
CONTROL
Δf = 300MC
1A1A1R1
SYNC.
LEVEL
SWEEP
RATE
CONTROL
CENTER
FREQ
Δf ±150MC
SYNC.
SELECTOR
SWEEP
RATE
SELECTOR
TO UNIT 1A1A2-J1
(RG 71/U)
UNIT 1A1S7
CHANNEL
SWITCH
1-100-200 MC
UNIT 1A1S8
LIN.-LOG
SELECTOR


NTENNA
J1
J1
1A3K1
DELAY
RELAY
J22
RG 9 B/U
T2
5
UNIT 1A1S5
RG 9 B/U
2
J3
RG 71 A/U
J1
RG 71 A/U
J19
TO UNIT 1A2J5
RG 71 A/U
TO UNIT 1A2J6
J18
J2
J1
J1
1A4K1
DELAY
RELAY
S7
UNIT 1A1S2
SELECTIVITY
SWITCH
1- 5MC
2- 1.3MC
3 400KC
4 - 25KC
5- 5KC
1A2
UNIT 1S1
J2
J3
J4
J1
UNIT
UNIT 1A1CR1&2 1A1S1
MAIN
PLATE
SWITCH

UNIT 1A3

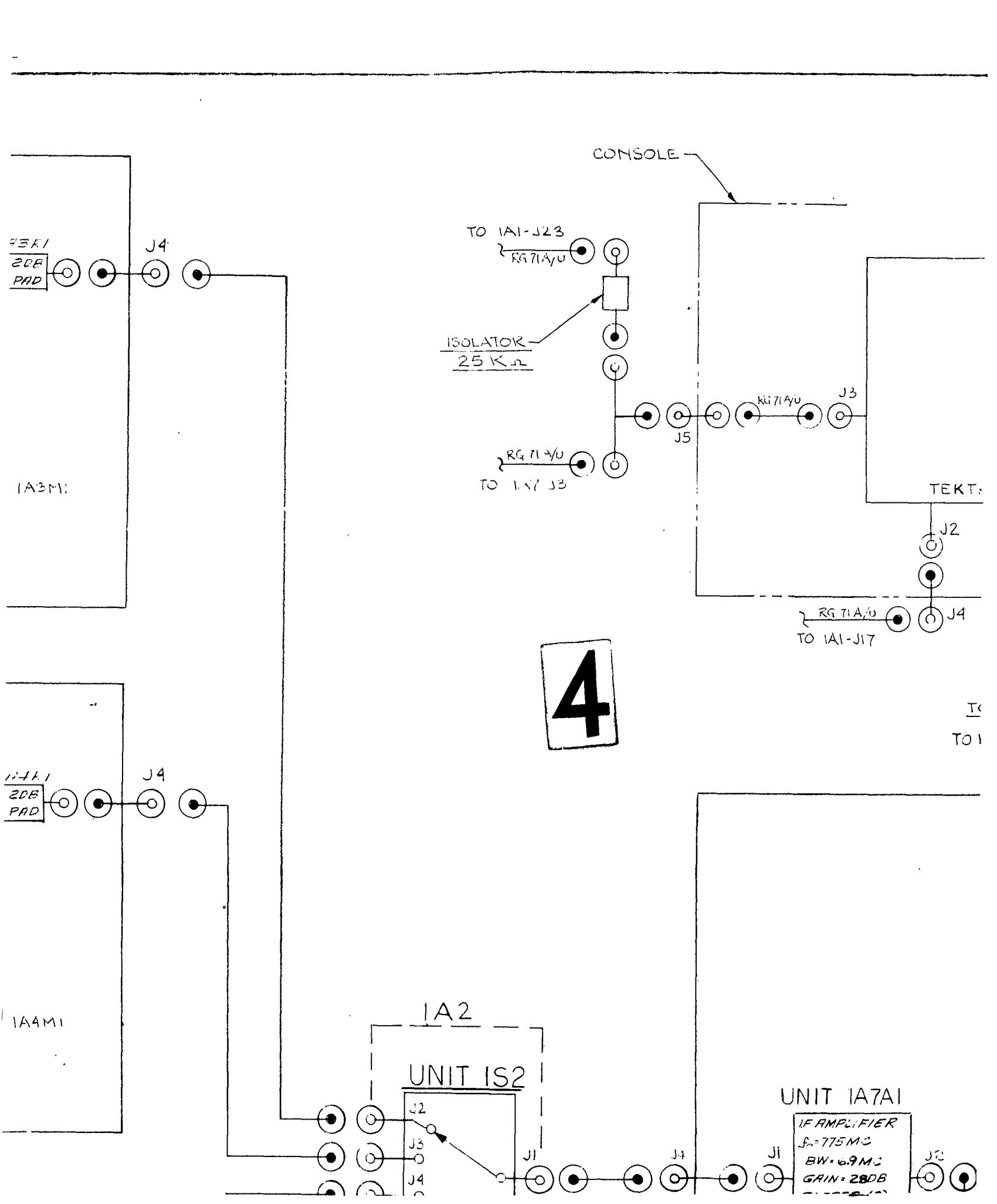


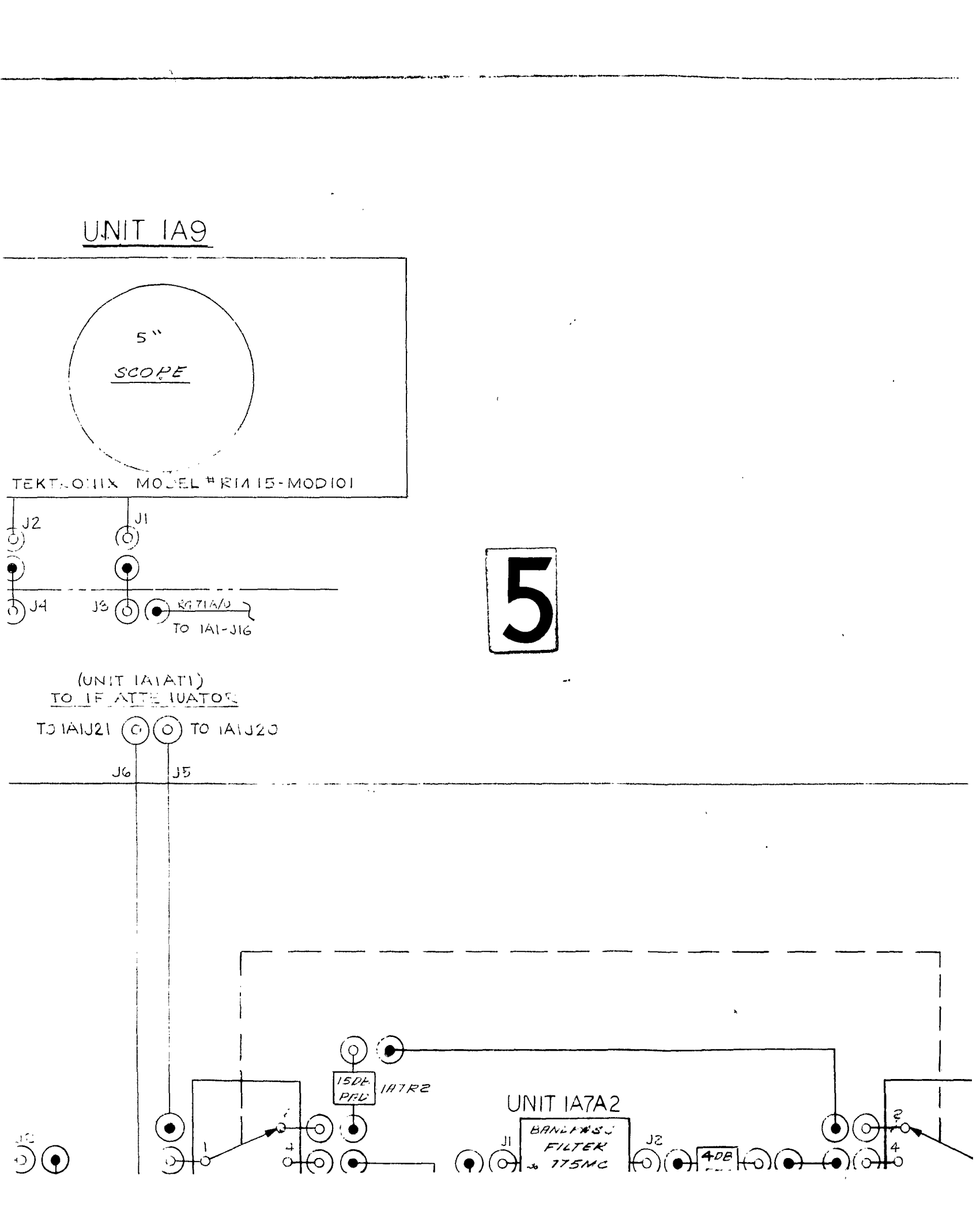
UNIT 1A4

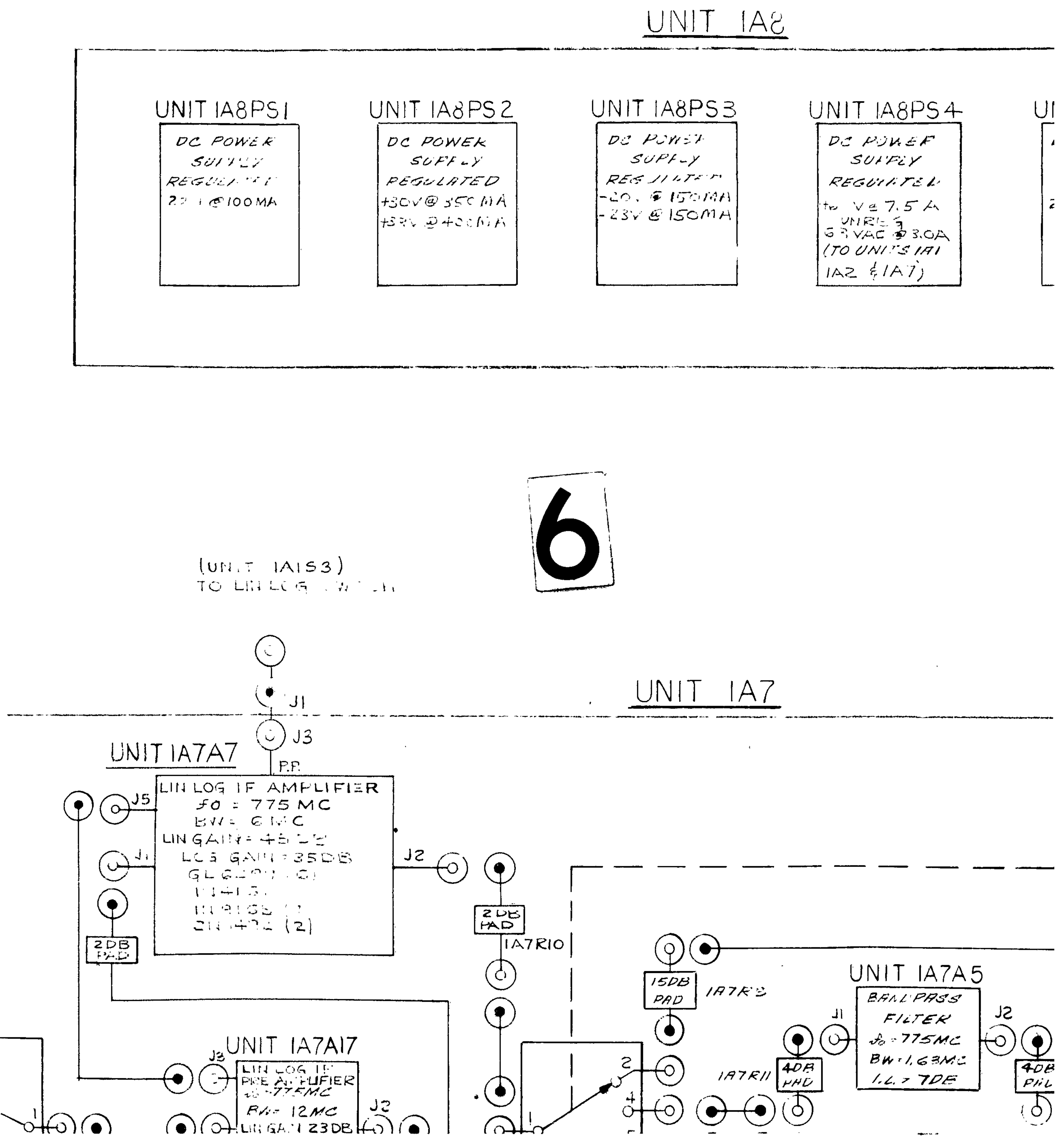


3

UNIT 1A5


CONSOLE
TO 1A1-J23
RG 71A/U
ISOLATOR
25 KΩ
RG 71A/U
J3
J5
RG 71A/U
TO 1A1-J7 J3
TEKT
J2
RG 71A/U
J4
TO 1A1-J17
4
20B PAD
J4
1A3M1
20B PAD
J4
1A4M1
1A2
UNIT 1S2
J2
J3
J4
J1
J1
J4
UNIT 1A7A1
IF AMPLIFIER
fo = 775 MC
BW = 6.9 MC
GAIN = 28DB
J2


UNIT 1A9
5"
SCOPE
TEKTRONIX MODEL # RM 15-MOD 101
J2
J1
J4
J3
RG 71A/U
TO 1A1-J16
5
(UNIT 1A1AT1)
TO IF ATTENUATOR
TO 1A1J21
TO 1A1J20
J6
J5
150Ω PAD
1A7R2
UNIT 1A7A2
J1
BANDPASS FILTER @ 175MC
J2
4DB
1
4
2
4


UNIT IA8
UNIT IA8PS1
DC POWER SUPPLY REGULATED
UNIT IA8PS2
DC POWER SUPPLY REGULATED
+30V @ 350 MA
UNIT IA8PS3
DC POWER SUPPLY
-23V @ 150MA
UNIT IA8PS4
DC POWER SUPPLY REGULATED
6.3 VAC @ 3.0A
(TO UNITS IA1
IA2 & IA7)
6
(UNIT IA1S3)
TO LIN LOG SWITCH
UNIT IA7
J1
J3
UNIT IA7A7
LIN LOG IF AMPLIFIER
f0 = 775 MC
J5
J2
LOG GAIN = 35DB
(2)
2DB PAD
IA7R10
UNIT IA7A17
LIN LOG IF PRE AMPLIFIER
BW = 12MC
LIN GAIN 23DB
15DB PAD
UNIT IA7A5
BAND PASS FILTER
f0 = 775MC
BW = 1.63MC
IA7R11
4DB PAD

UNIT 1A8PS5

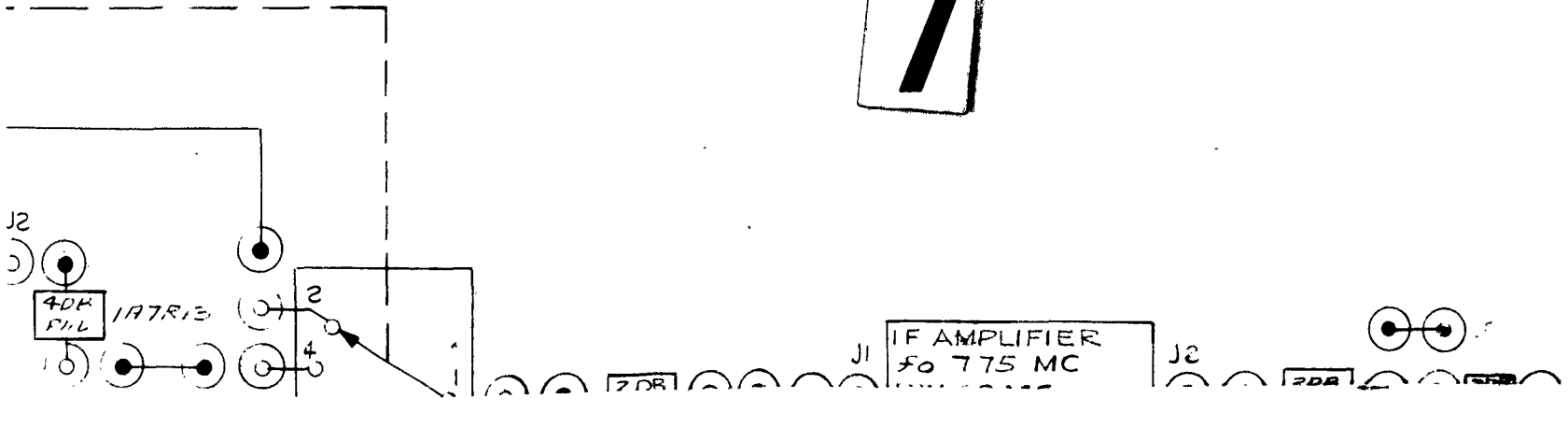
D3 POWER SUPPLY

Z = .+1.5A

NOTE –

1. UNLESS OTHERWISE SPECIFIED, ALL RF CABLING TO BE RG 55B/U.

7



REVISIONS			
ISSUE	DESCRIPTION	DATE	BY
B	[illegible]	7/26/62	FP
[illegible]	[illegible]	[illegible]	[illegible]
D	[illegible]	11/6/62	JM
E	REVISED TITLE	12/17/62	AW
F	REVISED	1-9-63	RD.
G	REV 1AB1S1	2-1-63	JM
H	REVISED	3-8-63	RD
J	REV. 1A2, 759320 WAS RG195/U	3-21-63	RD

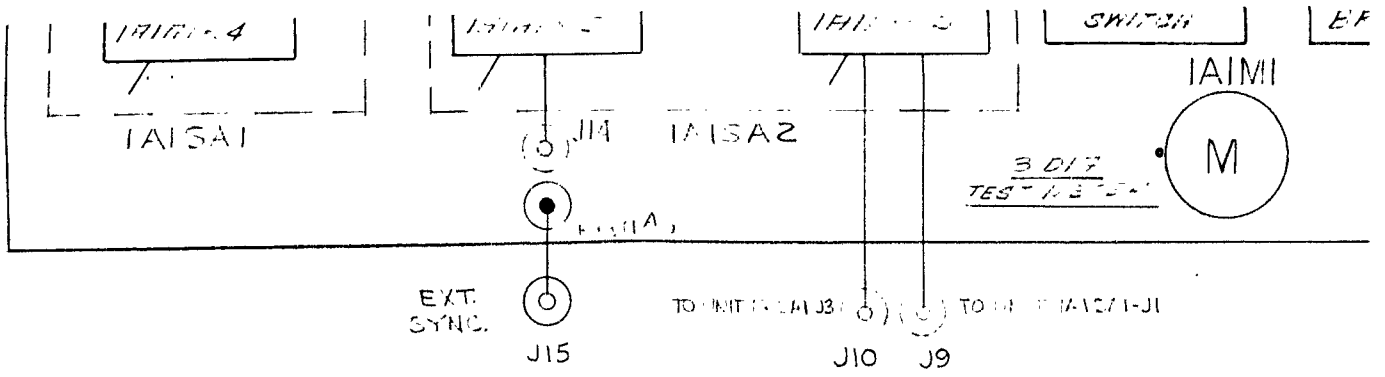
8

ISE SPECIFIED, ALL
BE RG 55B/U.

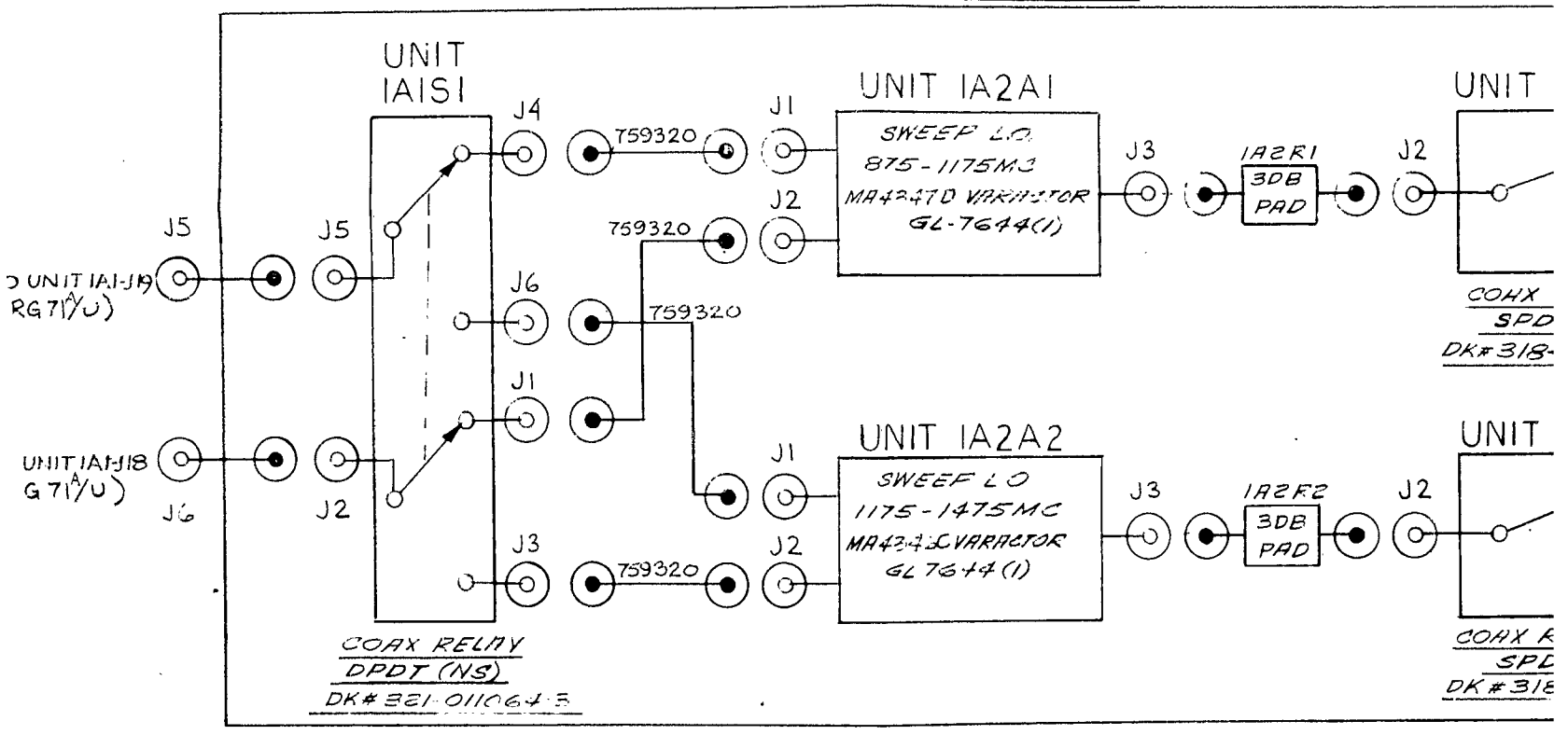
UNIT 1A7A8

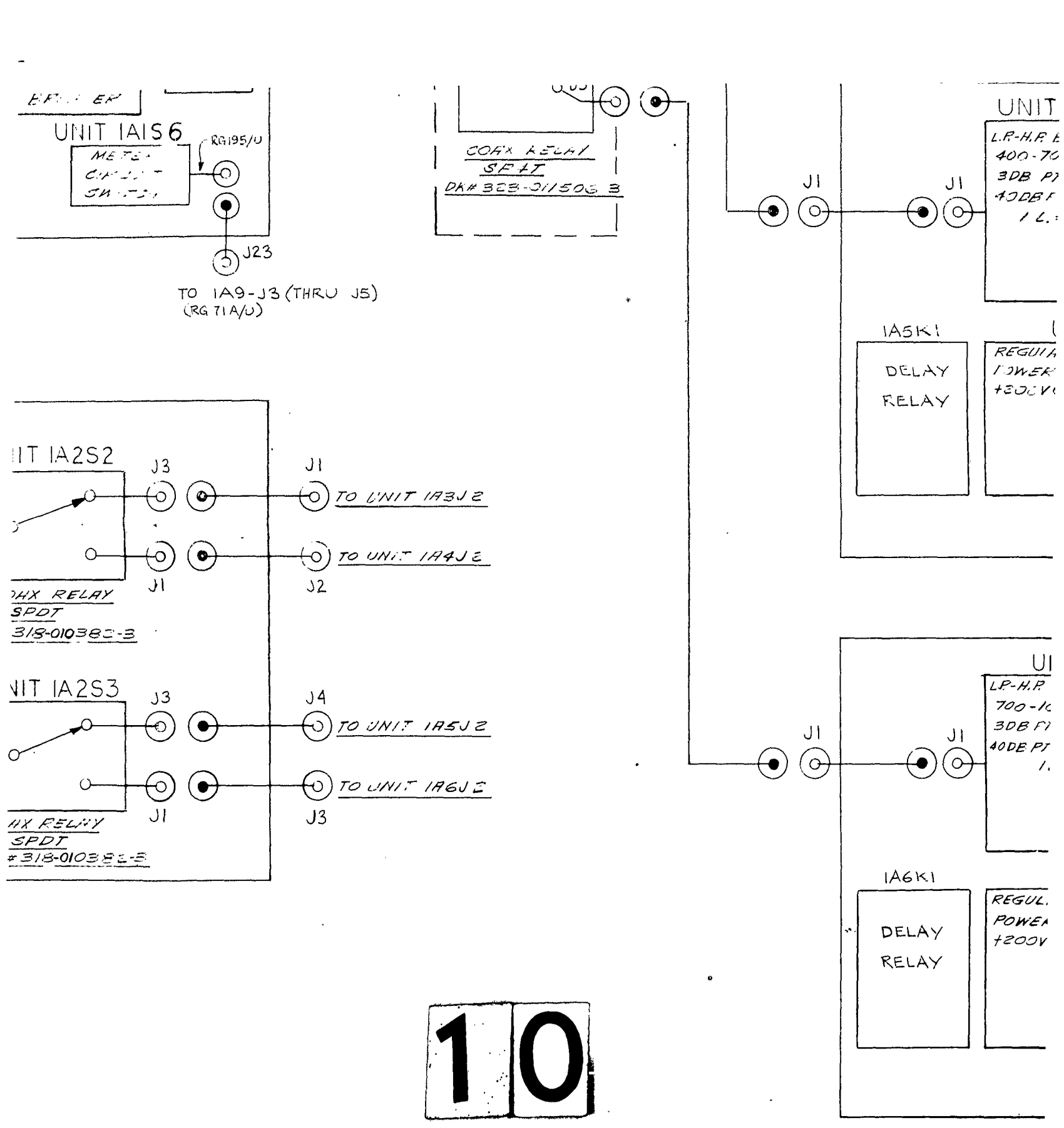
POWER I.F AMPLIFIER λ = 775MC BW 10MC	LINEAR DETECTOR 7341

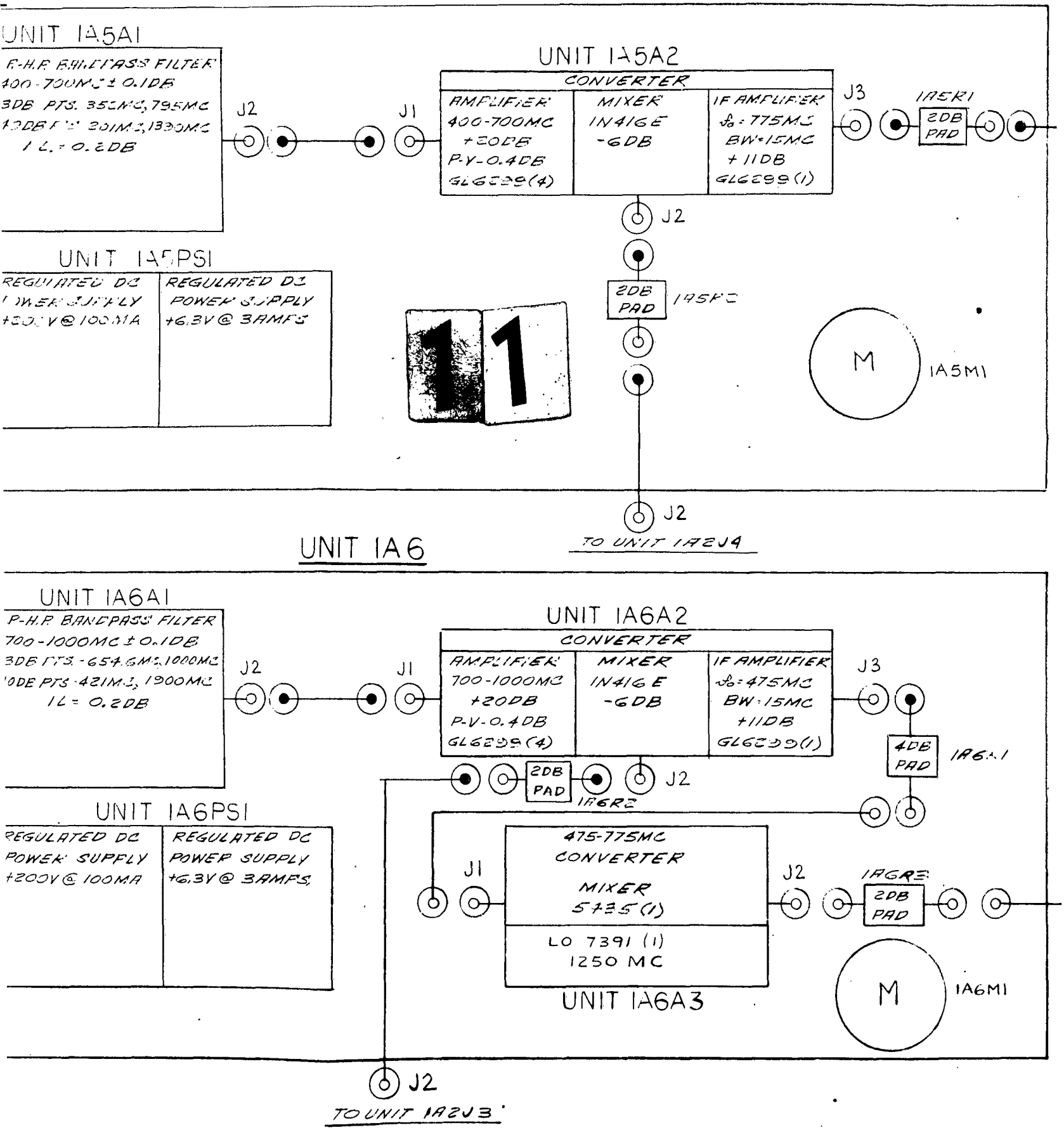
J1 J2 RG 71/U J3 VIDEO OUTPUT


1A1SA1
1A1SA2
SWITCH
1A1M1
M
J14
EXT. SYNC.
J15
J10
J9

UNIT 1A2

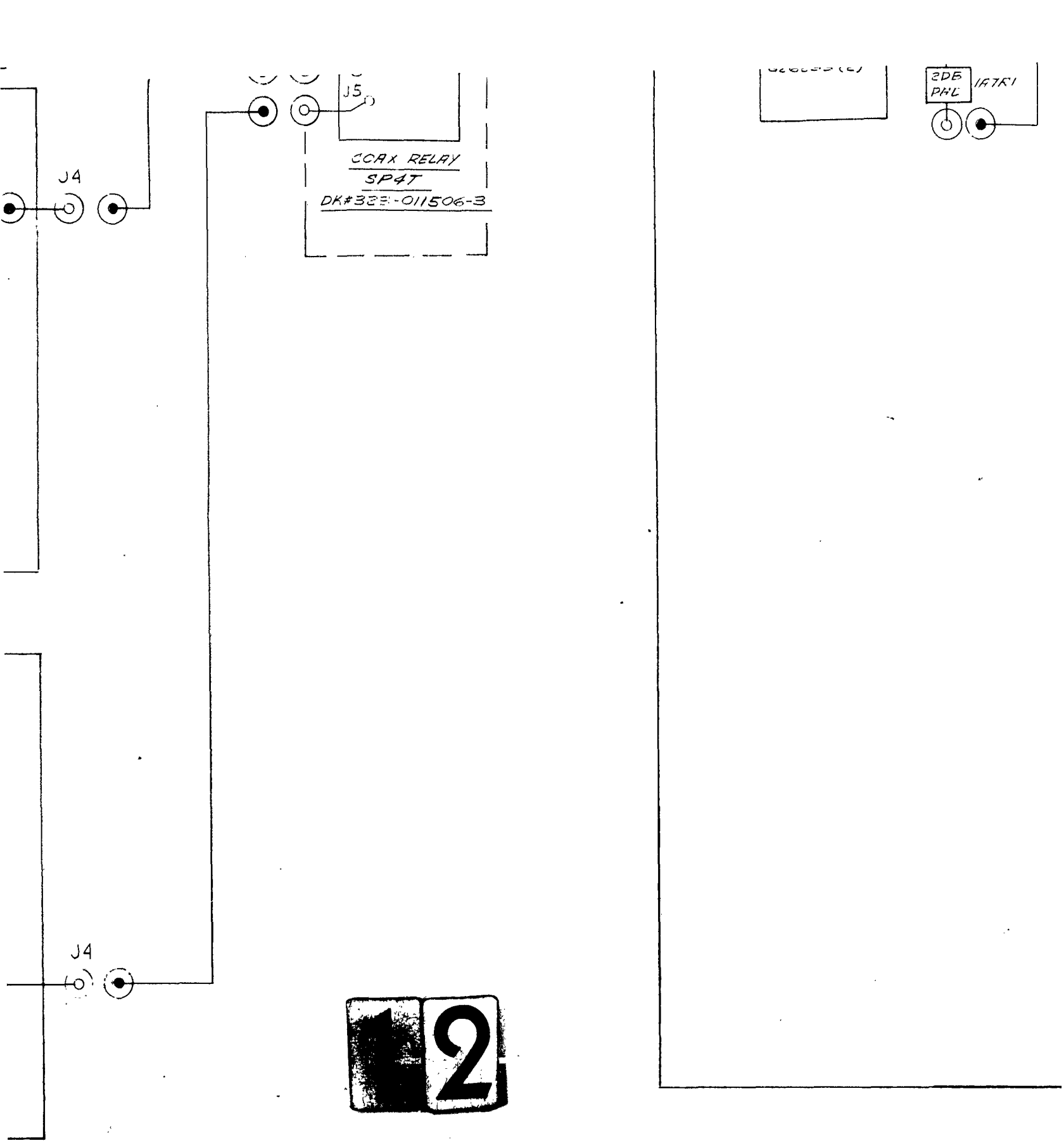

UNIT 1A1S1
J4
J5
J5
J6
J6
J2
J1
J2
J3
759320
759320
759320
759320
UNIT 1A2A1
SWEEP L.O.
875-1175MC
MA42470 VARACTOR
GL-7644(1)
J1
J2
J3
1A2R1
3DB PAD
J2
UNIT 1A2A2
SWEEP L.O.
1175-1475MC
MA43430 VARACTOR
GL 7644 (1)
J1
J2
J3
1A2R2
3DB PAD
J2
COAX RELAY
DPDT (NS)
DK# 321-011064-5
UNIT
COAX
SPD
UNIT
COAX R
SPD

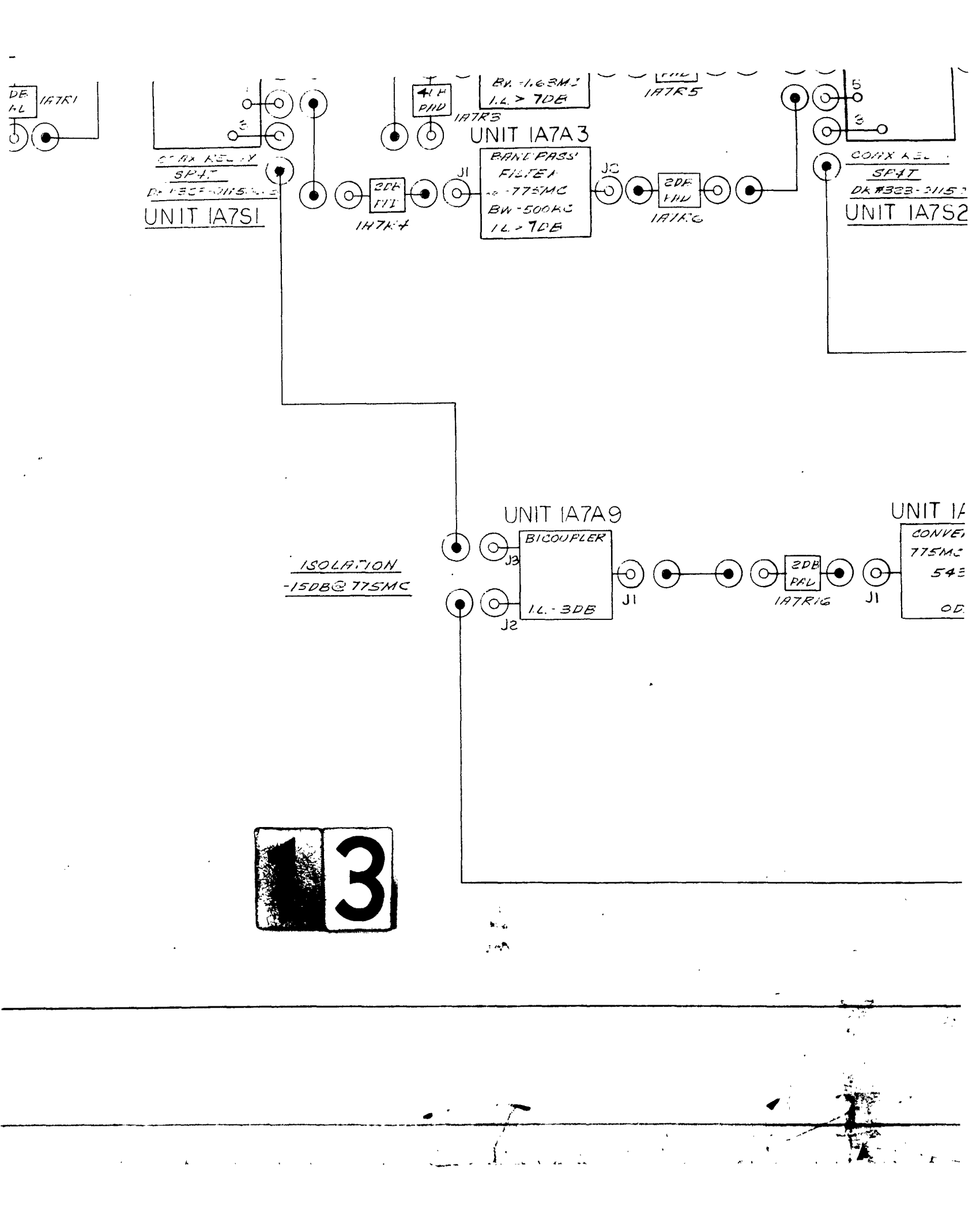

UNIT 1A1S6
METER CIRCUIT SWITCH
RG195/U
J23
TO 1A9-J3 (THRU J5)
(RG 71A/U)
COAX RELAY
SPDT
P/N 328-311503-3
J1
J1
UNIT
L.P.-H.P.
400-7
3DB P
40DB
1 L.
1A5K1
DELAY
RELAY
REGUL
POWER
+20
UNIT 1A2S2
J3
J1
TO UNIT 1A3J2
TO UNIT 1A4J2
J1
J2
COAX RELAY
SPDT
318-010380-3
UNIT 1A2S3
J3
J4
TO UNIT 1A5J2
TO UNIT 1A6J2
J1
J3
COAX RELAY
SPDT
#318-010382-3
J1
J1
UNIT
L.P.-H.P.
700-1
3DB P
40DB P
1.
1A6K1
DELAY
RELAY
REGUL.
POWER
+20

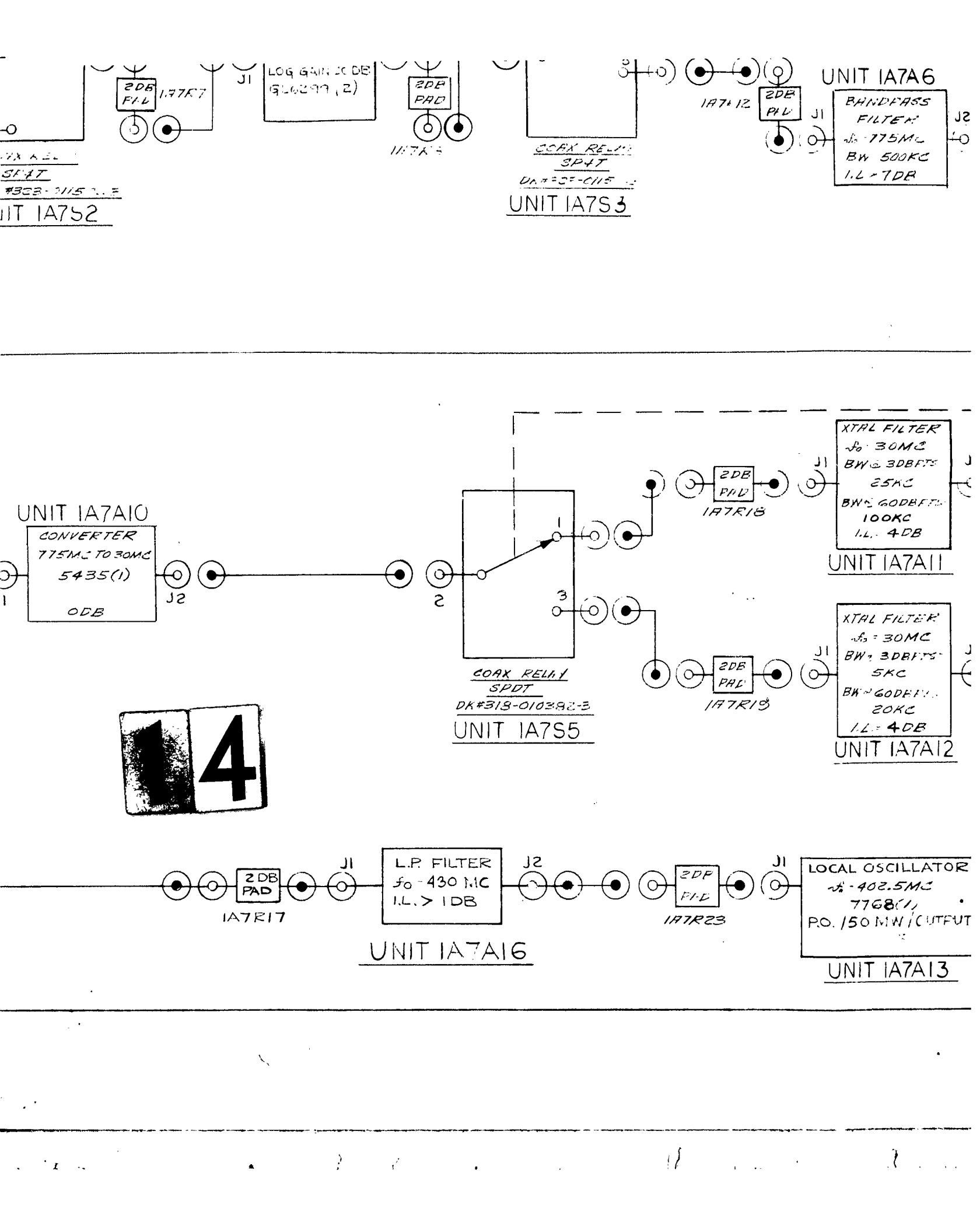

UNIT 1A5A1
P-H.P. BANDPASS FILTER
400-700MC ± 0.1DB
3DB PTS. 355MC, 795MC
40DB PTS. 201MC, 1330MC
I.L. = 0.2DB
J2
J1
UNIT 1A5A2
CONVERTER
AMPLIFIER
400-700MC
+20DB
P-V-0.4DB
GL6299(4)
MIXER
IN416E
-6DB
IF AMPLIFIER
fo = 775MC
BW=15MC
+11DB
GL6299(1)
J3
1A5R1
2DB PAD
J2
2DB PAD
1A5P2
UNIT 1A5PS1
REGULATED DC POWER SUPPLY +20V @ 100MA
REGULATED DC POWER SUPPLY +6.3V @ 3AMPS
M
1A5M1
J2
TO UNIT 1A2J4

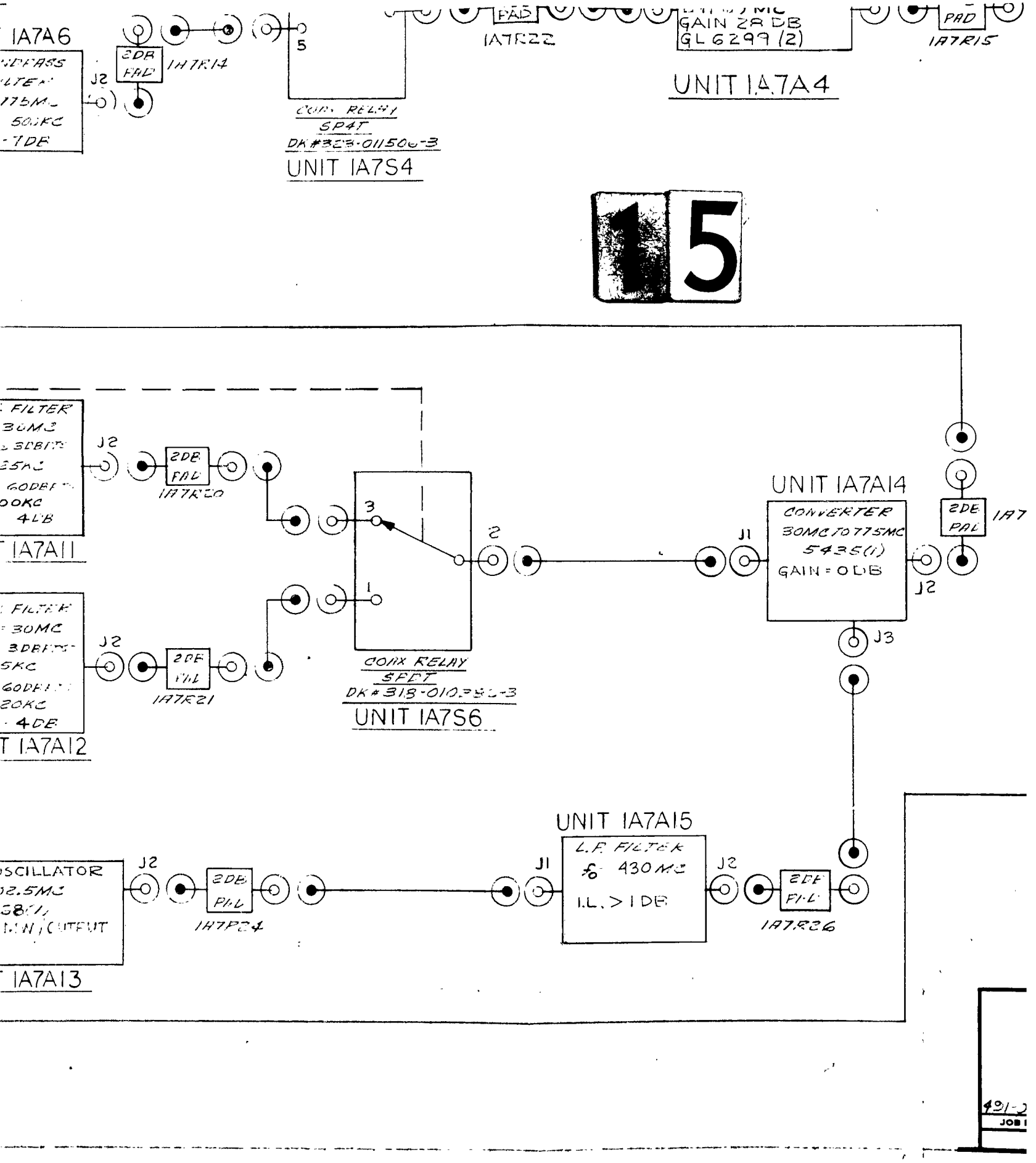
UNIT 1A6

UNIT 1A6A1
P-H.P. BANDPASS FILTER
700-1000MC ± 0.1DB
3DB PTS. 654.6MC, 1000MC
40DB PTS. 421MC, 1900MC
I.L. = 0.2DB
J2
J1
UNIT 1A6A2
CONVERTER
AMPLIFIER
700-1000MC
+20DB
P-V-0.4DB
GL6299(4)
MIXER
IN416E
-6DB
IF AMPLIFIER
fo = 475MC
BW=15MC
+11DB
GL6299(1)
J3
4DB PAD
1A6A1
2DB PAD
1A6R2
J2
UNIT 1A6PS1
REGULATED DC POWER SUPPLY +20V @ 100MA
REGULATED DC POWER SUPPLY +6.3V @ 3AMPS
475-775MC CONVERTER
MIXER
5735(1)
LO 7391 (1)
1250 MC
J1
J2
1A6R3
2DB PAD
UNIT 1A6A3
M
1A6M1
J2
TO UNIT 1A2J3


J5
COAX RELAY
SP4T
DK#323-011506-3
J4
J4
2DB
PAL
1A7K1


1A7R1
UNIT 1A7S1
1A7R4
2DB FXD
UNIT 1A7A3
BANDPASS FILTER
CF = 775MC
BW = 500KC
IL > 7DB
J1
J2
BW = 1.63MC
IL > 7DB
1A7R3
4DB PAD
1A7R5
2DB FXD
1A7R6
UNIT 1A7S2
UNIT 1A7A9
BICOUPLER
J3
J1
J2
IL = 3DB
ISOLATION
-15DB @ 775MC
2DB PAD
1A7R16
J1
UNIT 1A
CONVE
775MC
543
OD


UNIT 1A7A6
BANDPASS FILTER
fo 775MC
BW 500KC
I.L. 7DB
J1
J2
2DB PAD
1A7R12
UNIT 1A7S3
UNIT 1A7S2
UNIT 1A7A10
CONVERTER
775MC TO 30MC
5435(1)
0DB
J2
COAX RELAY
SPDT
DK#318-0103B2-B
UNIT 1A7S5
2DB PAD
1A7R18
XTAL FILTER
fo 30MC
BW @ 3DB FTS
25KC
BW @ 60DB FTS
100KC
I.L. 4DB
UNIT 1A7A11
2DB PAD
1A7R19
XTAL FILTER
fo 30MC
BW @ 3DB FTS
5KC
BW @ 60DB FTS
20KC
I.L. 4DB
UNIT 1A7A12
14
2DB PAD
1A7R17
L.P. FILTER
fo 430 MC
I.L. > 1DB
UNIT 1A7A16
2DB PAD
1A7R23
LOCAL OSCILLATOR
fo 402.5MC
7768(1)
P.O. 150 MW OUTPUT
UNIT 1A7A13


IA7A6
J2
2DB PAD
IA7R14
5
COAX RELAY SP4T
UNIT IA7S4
PAD
IA7R22
GAIN 28 DB
GL6299(2)
UNIT IA7A4
PAD
IA7R15
15
FILTER
30MC
J2
2DB PAD
IA7R20
IA7A11
J2
2DB PAD
IA7R21
IA7A12
3
2
1
COAX RELAY SPDT
UNIT IA7S6
UNIT IA7A14
CONVERTER
30MC TO 775MC
5435(1)
GAIN = 0 DB
J1
J2
J3
2DB PAD
IA7
OSCILLATOR
IA7A13
J2
2DB PAD
IA7P24
UNIT IA7A15
L.P. FILTER
fc 430 MC
I.L. > 1 DB
J1
J2
2DB PAD
IA7R26

PAD
1A7R15

PAD

GAIN=25DB
TTC 2(2)

EMITTER
FOLLOWER

TO SCOPE (J3)
Z=1000Ω

2DL
PAL
1A7R27

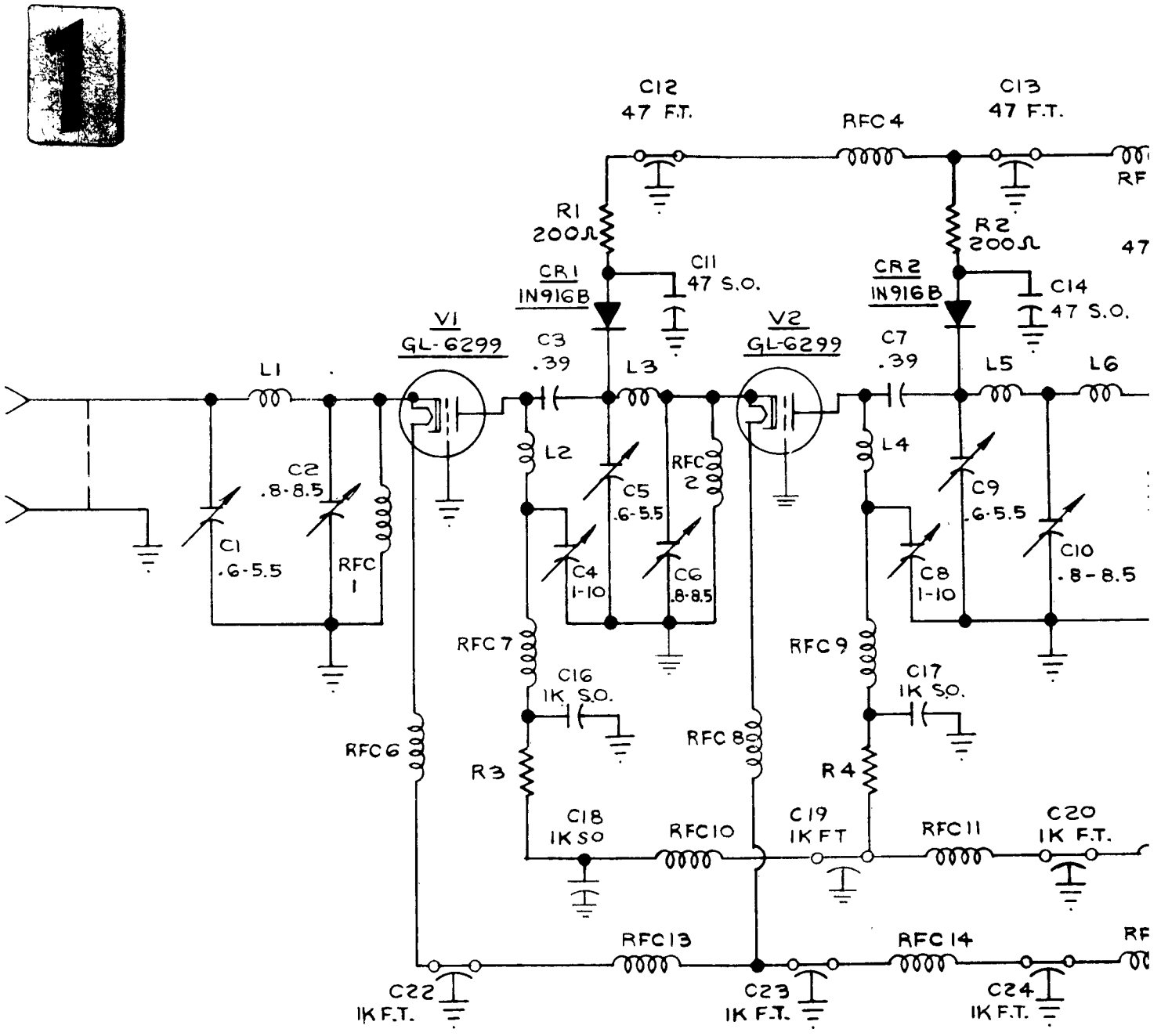
J2

16

700449 F

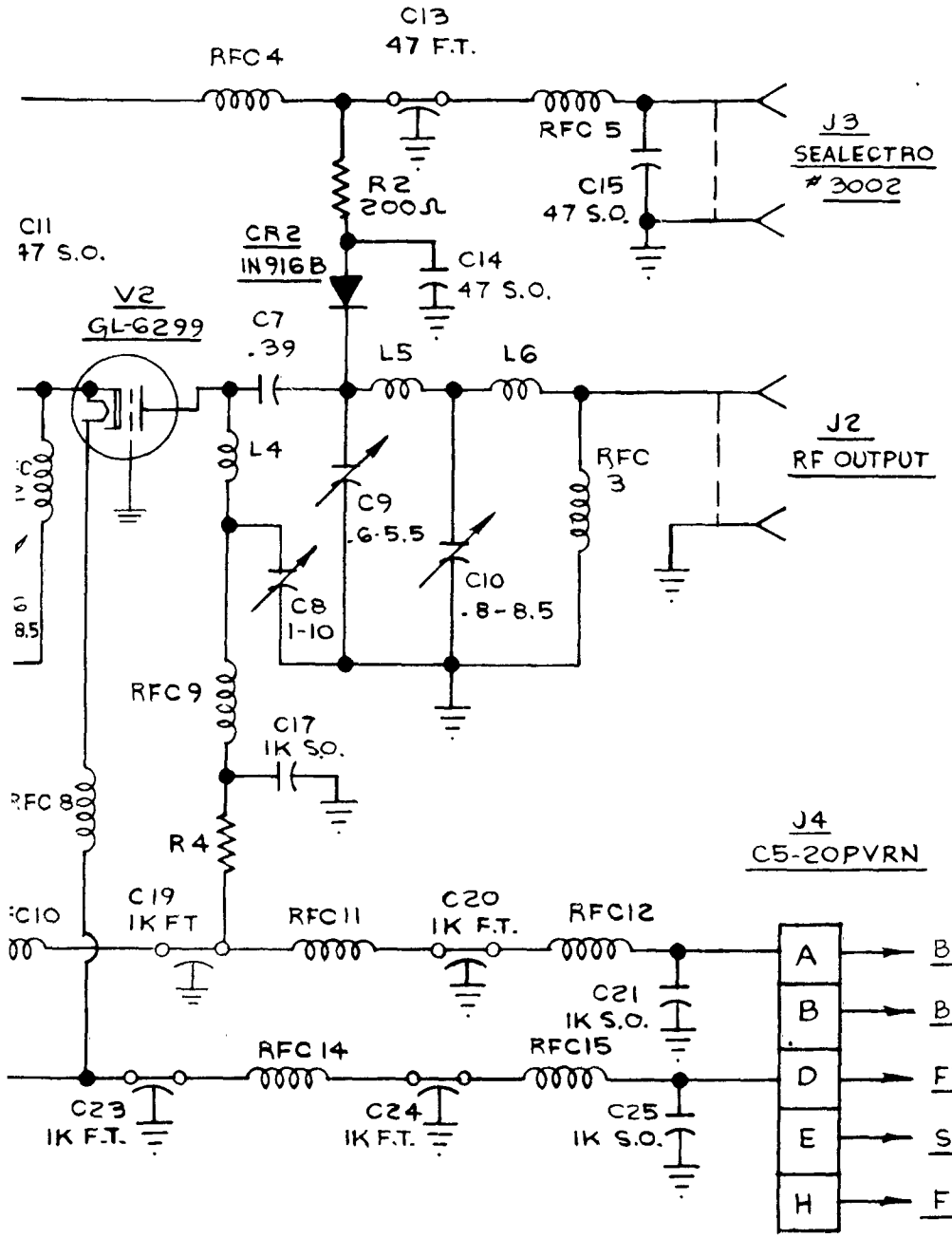
431 21		ALL DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED TOLERANCES: FRACTIONS ± 1/64 ANGLES ± 1/2° DECIMALS .XX ±.010 .XXX ±.005	DRAWN 10 May '62	BLOCK DIAGRAM RF SPECTRUM ANALYZER	APPLIED RESEARCH INC. PORT WASHINGTON NEW YORK
JOB NO.	NEXT ASSEMBLY	MATERIAL:	DRAWN BY F		DWG. SIZE R 700449
APPLICATION		FINISH:	CHECKED		ISSUE L J
			APPROVED		
			APPROVED	SCALE	UNIT WT.

FIG-2



ALL DIMENSIONS IN IN
OTHERWISE SPECIFIED
FRACTIONS ± 1/64
DECIMALS .XX ± .010

REVISIONS			
ISSUE	DESCRIPTION	DATE	BY
B	INTERCHANGE C18 WITH C19	10-16-62	HB



NOTE

1. ALL CAPACITORS IN mmf
2. R3 & R4 SELECTED FOR 10MA TUBE CURRENT
3. F_o = 775 MC

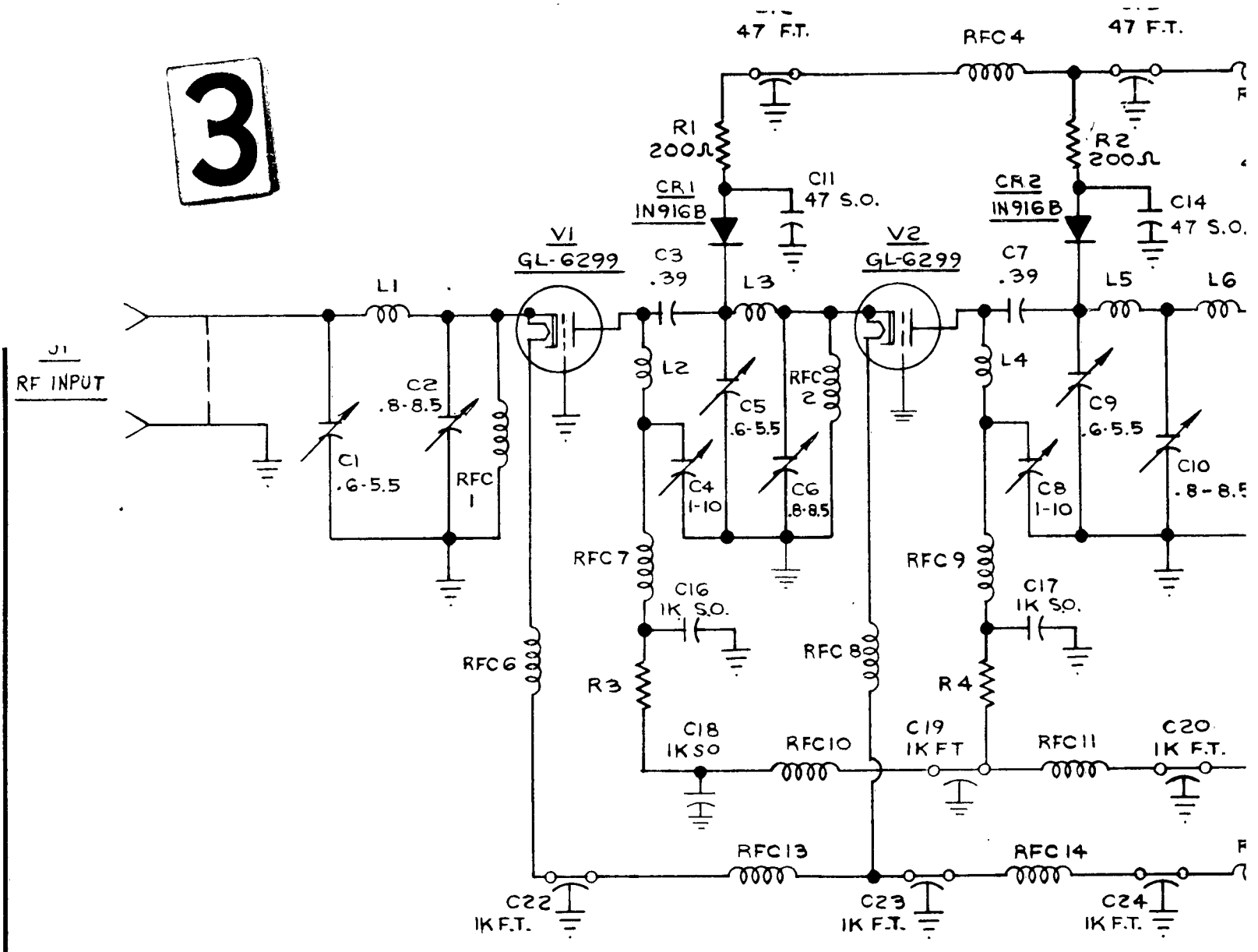
2

ISSUE B

600853

ALL DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED TOLERANCES: FRACTIONS ± 1/64 ANGLES ± 1/2° DECIMALS .XX ± .010 .XXX ± .005	DRAWN 8-14-62 DRAWN BY M.MERBERG	SCHEMATIC E-2(A) 775/6 LIN-LOG IF	APPLIED RESEARCH INC. PORT WASHINGTON	

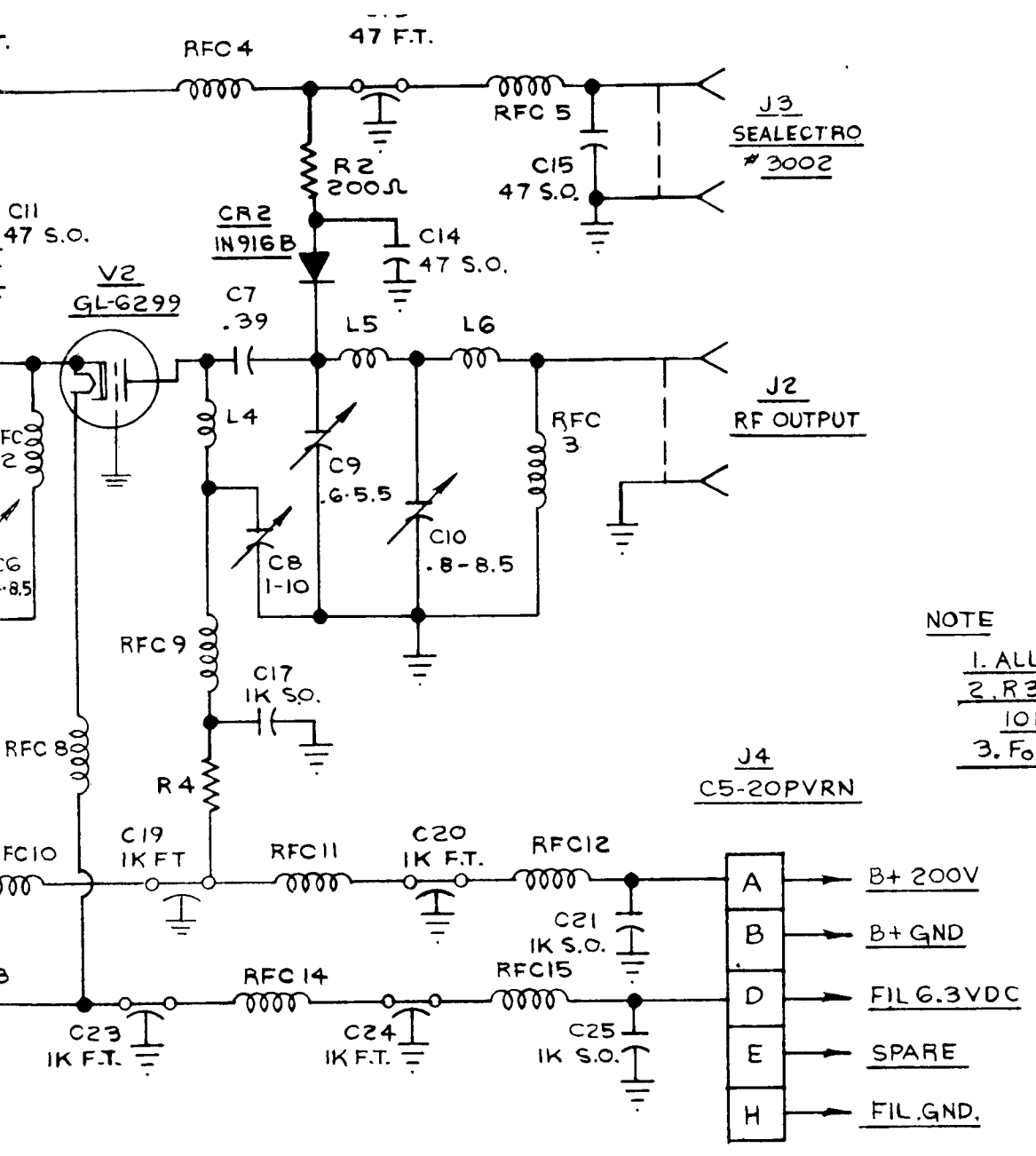
3



		ALL DIMENSIONS IN OTHERWISE SPECIFI FRACTIONS ± 1/64 DECIMALS .XX ± .010
		MATERIAL:
491-01	501677	FINISH:
JOB NO.	NEXT ASSEMBLY	
APPLICATION		

OGILVIE PRESS, INC., BROOKLYN 17, N. Y. ULTRAVEL NO. 490M

C-600853



NOTE

1. ALL CAPACITORS IN mmf
2. R3 & R4 SELECTED FOR 10MA TUBE CURRENT
3. F_o = 775 MC

4

491-01	501677	ALL DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED TOLERANCES: FRACTIONS ± 1/64 ANGLES ± 1/2° DECIMALS .XX ± .010 .XXX ± .005	DRAWN 8-14-62	SCHEMATIC E-2(A)775/6 LIN-LOG IF PRE-AMPLIFIER UNIT 1A7A17	APPLIED RESEARCH INC. PORT WASHINGTON NEW YORK
JOB NO.	NEXT ASSEMBLY	MATERIAL:	DRAWN BY M.MERBERG		DWG. SIZE C 600853
APPLICATION		FINISH:	CHECKED		ISSUE B
			APPROVED		
			APPROVED	SCALE	UNIT WT.

ISSUE A

600853

FIG.-3

	FEB	MARCH	APRIL	MAY	J
1. ENGINEERING DEVELOPMENT					
2. MECHANICAL DESIGN					
3. FABRICATION					
4. FINAL TEST					

WORK COMPLETED

WORK TO BE COMPLETED

JOB NO.	NEXT ASSEMBLY
APPLICATION	

ALL DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED TOLERANCES:
FRACTIONS ± 1/64 ANGLES ± 1/2°
DECIMALS .XX ± .010 .XXX ± .005

MATERIAL:

FINISH:

6-2

DR WIL

CH

AP

AP

OGILVIE PRESS, INC., BROOKLYN 17, N. Y. ULTRAVEL NO 490M

REVISIONS			
ISSUE	DESCRIPTION	DATE	BY

APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC

1962

2

NSIONS IN INCHES, UNLESS SE SPECIFIED TOLERANCES: ± 1/64 ANGLES ± 1/2° X ± .010 .XXX ± .005	DRAWN 6-21-62	SPECTRUM ANALYZER PROJECT. PERFORMANCE AND SCHEDULE CHART	APPLIED RESEARCH INC. PORT WASHINGTON NEW YORK
	DRAWN BY WILLIAMS		
	CHECKED		
	APPROVED		DWG. SIZE B — SF-138
	APPROVED	SCALE — UNIT WT. —	ISSUE B

	JAN	FEB	MARCH	APRIL
1. ENGINEERING DEVELOPMENT	■■■	———	———	
2. MECHANICAL DESIGN	■■■	———	———	
3. FABRICATION	■■■	———	———	
4. FINAL TEST		———	———	

1963

■■■ WORK COMPLETED

▭ WORK TO BE COMPLETED

JOB NO.	NEXT ASSEMBLY
APPLICATION	

ALL DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED TOLERANCES:
FRACTIONS ± 1/64 ANGLES ± 1/2°
DECIMALS .XX ± .010 .XXX ± .005

MATERIAL: ———

FINISH: ———

OGILVIE PRESS, INC., BROOKLYN 17, N. Y. ULTRAVEL NO. 490M

REVISIONS			
ISSUE	DESCRIPTION	DATE	BY

...ARCH	APRIL

1963

2

...IONS IN INCHES, UNLESS SPECIFIED TOLERANCES: ...1/64 ANGLES ± 1/2° ...± .010 .XXX ± .005	DRAWN 3 11-63	SPECTRUM ANALYZER PROJECT PERFORMANCE AND SCHEDULE CHART	APPLIED RESEARCH INC. PORT WASHINGTON NEW YORK
	DRAWN BY J M.		
	CHECKED		
	APPROVED		DWG. SIZE B — SF 138
	APPROVED	SCALE — UNIT WT.	ISSUE

FIG-5 2 OF 2